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PORTLAND CEMENT

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How to Use Portland Cement

By

WM. G. HARTRANFT

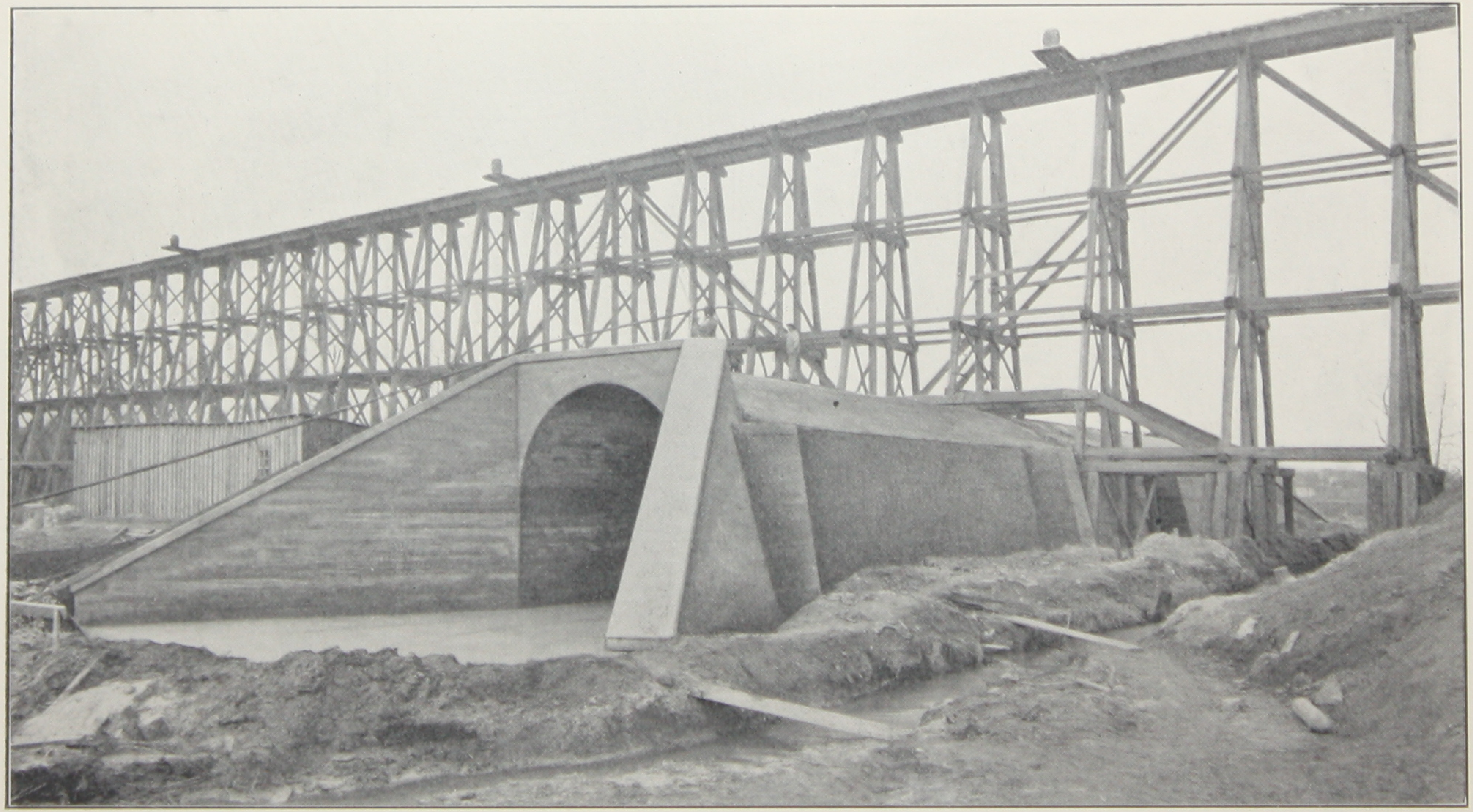
VIRGINIA
PORTLAND CEMENT CO.

WORKS: CRAIGSVILLE, VA.
OFFICE: NEW YORK

MANUFACTURERS OF

OLD DOMINION
PORTLAND CEMENT

WM. G. HARTRANFT CEMENT CO.
Selling Agent
REAL ESTATE TRUST BUILDING
Broad and Chestnut Streets
PHILADELPHIA
1901



Concrete Culvert, P. & M. Div. N. C. & St. Louis R. R.

Built of Old Dominion Portland Cement

(See page 18)

Hunter McDonald, Engineer

Nashville Roofing and Paving Co., Contractors

Extracts from "Das Kleine Cement-Buch" by the Association of German Portland Cement Manufacturers, on how to use Portland Cement. From the German of L. Golinelli, translated by Spencer B. Newberry, E. M., Ph. D.

"PORTLAND cement is a material which hardens in the presence of water, prepared by burning at a sintering temperature, an intimate mixture, consisting essentially of lime (or carbonate of lime), and clay in certain definite proportions.

"The raw materials, clay and carbonate of lime, are ground and mixed according to their character, in either the wet or the dry way. If the dry process is used the mixed materials are moistened with water and molded into blocks.* In the wet process the bricks are made from the wet material after it has been reduced to the proper consistency. After drying, the bricks of cement material are burned in suitable kilns to the point of sintering. The resulting 'clinker' is ground to a fine powder: this is the finished cement."

"It is in the power of the manufacturer to produce either **Quick-Setting** or **Slow-Setting** cement, as may be required. A cement which requires two hours or longer to set is called **Slow-Setting.** Such cement is **preferable** to that which sets quickly on account of its greater strength. Quick-setting cement is used only for certain special purposes. Slow-setting cement can be made to set more quickly by using warm water, and also by limiting the water used to the smallest possible quantity. In all cases the consumer will do well to notify the manufacturer what time of setting is desired: also for what purposes the cement is to be used. In this way, many unjust complaints in regard to quality and many unnecessary expenses may be avoided."

"When Portland cement is mixed with a suitable quantity of water a plastic paste is produced, which after a time becomes hard. The change from a semi-liquid to a solid mass is called **setting,** and the time required for this change **the time of setting.** Cement is said to be set when it resists a light pressure of the finger nail on

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* Where rotary kilns are used the mixed materials are fed to the kiln in powdered form.

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the surface. The processes of **setting** and **hardening** should not be confused. The latter begins at the point where the former ceases, and continues up to the highest strength which the cement attains after the lapse of many years."

Referring to the physical conditions under which cement hardens they say,—"Among the most important of these conditions are **rest** during the setting and **protection from too rapid drying out.** The latter point cannot be too strongly insisted upon. If the cement is deprived of the necessary water, it can never reach its full hardness. The common practice of wetting bricks just before use by sprinkling with water from the mason's brush is quite insufficient. The bricks should be kept under water in a vessel until thoroughly saturated, and a stiff mortar used."

"Great care should be taken to mix only such a quantity of mortar as can be conveniently used in the time available." (That is before the setting of the cement.) "**Remnants of mortar which have become set should be discarded and must under no circumstances be again worked up with water.**"

"Portland cements suffer changes in volume on hardening in water or in air. In the case of good Portland cement, however, these changes are extremely small and much less than those which occur in different kinds of stone. Bad cements, on the other hand, may show the dangerous quality of cracking or swelling. This shows itself in a strong expansion, which destroys the cohesion of the mortar, and may cause its total destruction. Cement which swells badly, if laid between retaining walls, shows an immense power of expansion, even to the extent of forcing out the stones of the masonry. The swelling does not show itself until after the setting. The worse the fault, the sooner it will appear. It shows itself sooner, also, in water than in air. In pats of cement kept on glass in water this defect is to be noticed in the appearance of fine net-like cracks, or in worse cases in curving of the pats, and the appearance of cracks around the edges. **It is characteristic of expansion cracks that they run from the edges toward the centre of the pat and are widest at the edges and narrower toward the centre.** These expansion cracks should not be confused with shrinkage cracks, mention of which will be made later. The swelling of cement is always due to defects in manufacture.

These are:

1. Faulty composition of the raw material, especially too high a proportion of lime.
2. Imperfect preparation of the raw material.
3. Imperfect burning of the clinker.
4. Too high proportion of sulphate or magnesia."

"According to the German official requirements, a cement is considered to be constant in volume if a pat kept 28 days under water remains perfectly flat and free from cracks. Swelling due to too much lime shows itself in this test with certainty within a few days or weeks."

"It is sometimes noticed that pats of neat cement left in air, lose considerably in strength, and after a certain time become soft or friable, while similar pats kept in water are faultless in all respects. This is especially liable to occur in pats made very wet and allowed to dry out immediately after setting. If, on the other hand, the pats are kept moist during the first stages of hardening, this defect is not developed."

"Cracks, similar to those produced by swelling, are also produced when pats or briquettes are placed in water too soon, or before the setting is complete. To prevent this, the official requirements specify that test-pieces shall be kept 24 hours in moist air before placing in water."

"Too rapid drying in draughts of air or in sunshine, without the precaution of keeping the pats moist causes so-called **shrinkage cracks.** These may be distinguished in pats of cement from expansion cracks from the fact that they appear during the setting, and show themselves as irregular curved lines extending over the middle of the pat. As already stated the formation of shrinkage cracks is due to faulty use of the cement and has practically nothing to do with its quality."

Speaking of the compressive strength of cement they say:—"The compressive strength being generally from 8 to 12 times the tensile strength."

"It is by no means simple to make tensile strength tests in such a manner as to give reliable results. Complaints in regard to the quality of cements are often due entirely to faulty testing. In the preparation of the briquettes, the temperature and quantity of the water used, the character of the sand employed, and the thoroughness with which the mortar is worked are of immense influence on the results. The strength will generally be greater the less water is used: nevertheless it is always necessary to use such a quantity of water that it will show itself upon the surface of the briquette on tamping it into the mold."

"**As to Fineness of Grinding,** it may be mentioned that the **coarser particles of cement act practically like sand.** It is therefore important that the grinding be not too coarse. The finer the grinding, the more sand can be used with the cement."

PORTLAND CEMENT-LIME MORTAR.

"There are many kinds of work which require a quick hardening mortar, but for which the great strength of a mixture of 1 of cement with 1 to 4 of sand is unnecessary. The cost of such mortar is also for many purposes too high. A mixture of cement with 5 or more parts of sand would give abundant strength, but such mortars work too "short" and adhere too imperfectly to the stone or brick; it cannot therefore be safely used. In such cases the addition of slaked lime or hydraulic lime will correct the faults of poor mixtures of cement and sand, and will produce a cheap mortar, suitable for a great variety of uses. Used in this manner, Portland cement may be used with economy for the most ordinary purposes. The advantages of Portland cement-lime mortar are its cheapness in comparison with other hydraulic materials, its rapid hardening, marked hydraulic properties, great strength on exposure to air, and remarkable resistance to weather.

The following mixtures for cement-lime mortar have been found by experience to be most suitable:

Cement	1 Part,	Sand	5 Parts,	Lime Paste	½ Part
"	1 "	"	6 to 7 Parts,	"	1 "
"	1 "	"	8 Parts,	"	1½ Parts
"	1 "	"	10 "	"	2 "

The above proportions are to be taken by measure. Hydraulic lime may be used in the place of ordinary slaked lime.

Cement-lime mortar is prepared by making a dry mixture of the required quantities of cement and sand: milk of lime is then made with the necessary quantities of lime paste and water and this milk of lime thoroughly mixed and worked in with the mixture of sand and cement."

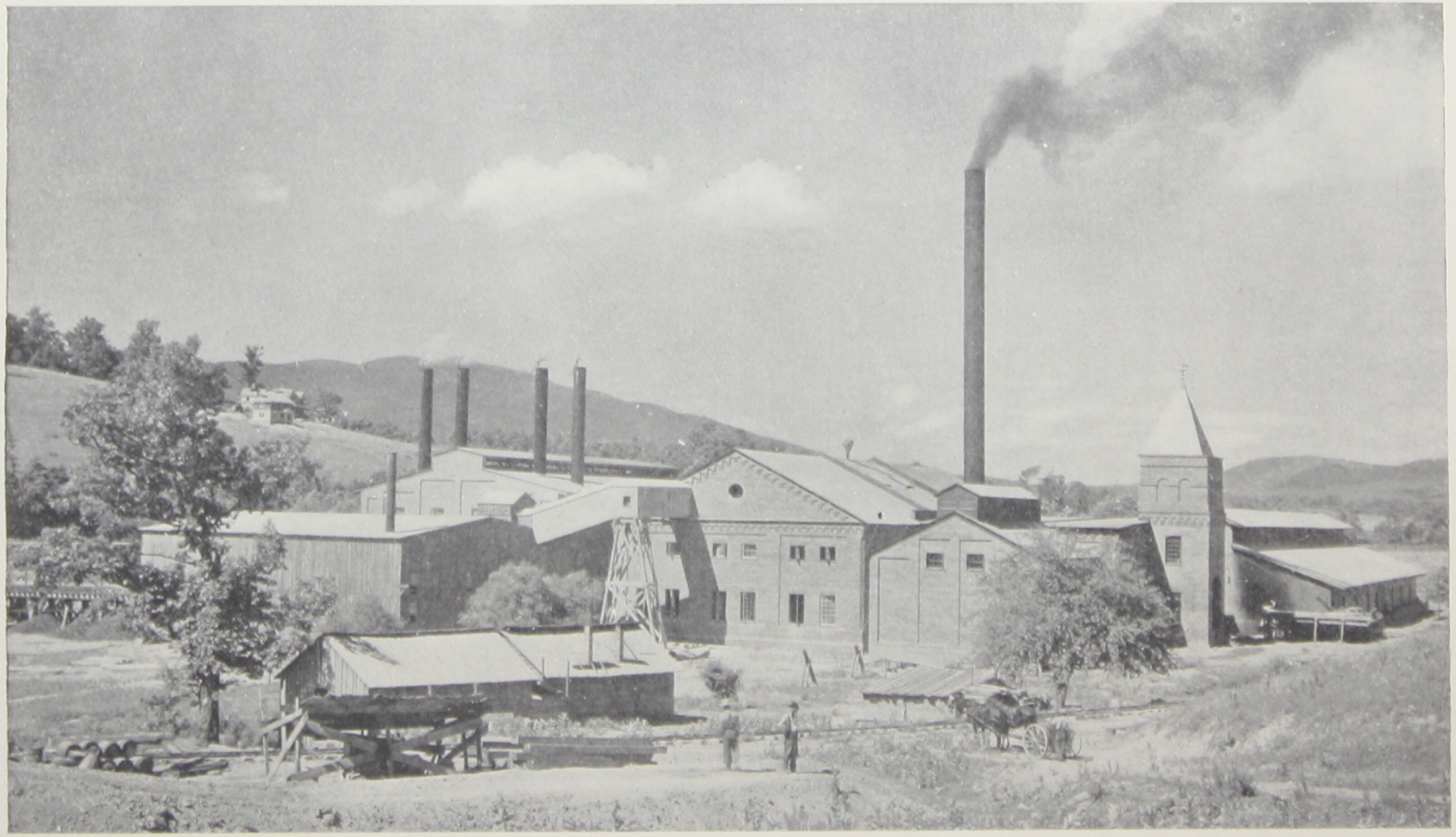
CEMENT PLASTERING

"Experience has shown that cement plastering on walls and cornices, even when made with faultless material, is not always permanent. Sometimes the surface scales off in thin layers; in other cases blisters form and crack, or the whole layer of plaster may separate from the wall and fall off. In all such cases, the work and not the cement is at fault. If walls are to be plastered with cement mortar it is indispensable that the surface be previously cleaned from dust, dirt, or lime mortar, washed and repeatedly wetted. Fine sand should be used, and for the purpose of avoiding hair cracks and shrinkage cracks, it is best to finish the surface with a felt polisher instead of a trowel or steel tool. Cement plastering must be kept moist and protected from wind and sun. Frost should be especially avoided. Cement work which is to be painted must be fully hardened and thoroughly dry. It is prudent to let the work stand a year before oil paint is applied. An excellent preparatory coating for oil paint is a solution of water-glass in 3 or 4 parts of water. After two applications the surface is washed with water. After a short time the water-glass is again applied. When dry the paint can be used."

Cement Sidewalk,
Fitchburg R. R., Boston

**Built of Old Dominion
Portland Cement**

A. S. Cheever, Chief Engineer
H. W. Hayes, Engineer in Charge



OLD DOMINION PORTLAND CEMENT WORKS

Craigsville, Va.

CEMENT MORTAR USED WITH ABSORBENT MATERIALS

Where cement mortar is used for pointing, the walls should first be made thoroughly wet, and the mortar itself, after being applied, frequently sprinkled with water from the end of a broom or a brush, during the day the work is done.

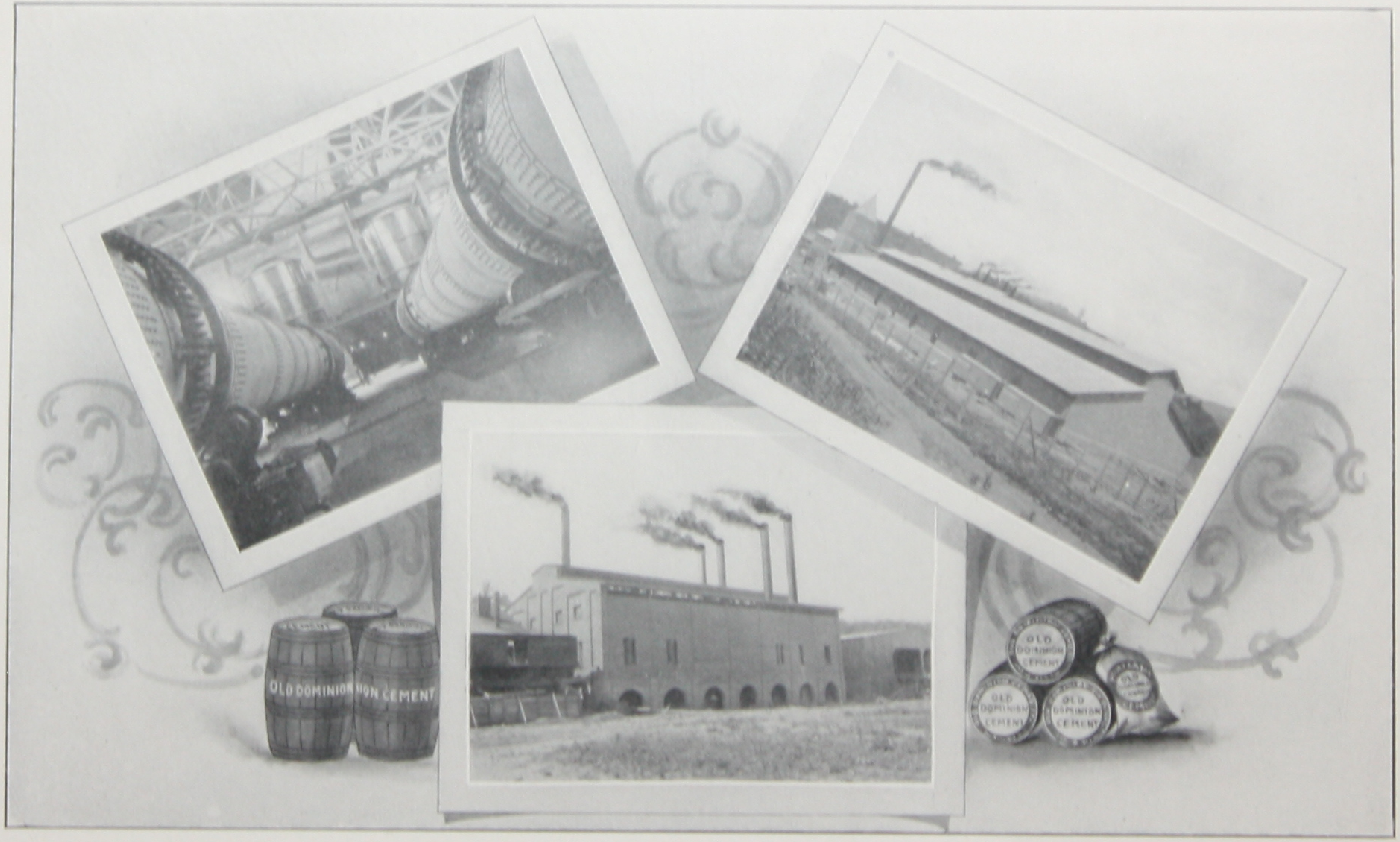
Any absorbent building material, such as brick or stone, used with cement mortar, should be made thoroughly wet before use. Unless this is done, the moisture in the mortar, necessary for the proper setting of the cement, will be inevitably absorbed, and the mortar itself will be left almost valueless.

USE OF CEMENT IN FROSTY WEATHER

While it is best never to use Portland cement during frosty weather, fairly good results may be obtained by using water, in which salt has been first completely dissolved, in quantities merely sufficient to prevent freezing, but care should be taken that the salt is first thoroughly dissolved before the addition of the water to the sand and the cement, for, if mixed when not thoroughly in solution, or, if added dry to the mortar after that is prepared, it will crystallize in small bodies by itself, very seriously weakening the work into which it enters. One pound of salt to every eighteen gallons of water, when the thermometer is at 32 degrees F., and one additional ounce of salt for every further degree below 32, is a fairly safe guide in the use of this material.

If heated water is used, it should not be added to the sand and the cement at a higher temperature than that at which the hand can be comfortably held in it. The materials used with the cement should also be moderately heated. Artificial heating of the water and the materials used with the cement, in the manner indicated, but only to the degree named, is very advantageous during frosty weather. **Do not heat the cement itself.**

If cement mortar or concrete can be kept from freezing until well set no injury will result from use in frosty weather. If, however, the preparation is frozen before the set takes place, the work will be utterly valueless.



Interior and Exterior View of Kiln Building Stock House

OLD DOMINION PORTLAND CEMENT WORKS

Old Dominion Portland Cement

IS guaranteed to be a first grade Portland Cement, to contain no deleterious matter, and to be a true Portland in every sense of the word. It is sound, finely ground and possesses the greatest tensile and crushing strain.

It is manufactured from lime stone and shale under the rotary dry process at Craigsville, Va., on the main line of the C. & O. R. R., in one of the most modern plants fully equipped with the very best machinery known to the cement industry, capacity, 800 barrels daily.

This cement is especially adapted for sidewalk and other artificial stone work, because of its great sand carrying capacity, permitting where large bodies of concrete are used, the addition of one part more clean sharp sand and two parts more broken stone than the average brand of foreign or domestic Portland Cement. Owing to the location of the mill, the **Old Dominion Portland Cement** can be placed in the Southern and Western markets at very advantageous prices.

WM. G. HARTRANFT CEMENT COMPANY,

Sole Selling Agent

UNITED STATES ENGINEER'S OFFICE

166 Granby Street

Norfolk, Va., October 30, 1900

Wm. G. Hartranft Cement Co.,
Philadelphia, Pa.

Gentlemen:

Referring to your letter of the 26th inst., would advise that "Old Dominion" brand of Portland Cement delivered at Fort Monroe, Va., recently, stood the tests required by the specifications.

Very respectfully,
(Signed) James B. Quinn,
Major, Corps of Engineers, U. S. A.

ENGINEER'S OFFICE
UNITED STATES ARMY

Room 415, Custom House

Cincinnati, Ohio, March 1, 1901

Wm. G. Hartranft Cement Co.,
Real Estate Trust Building,
Philadelphia, Pa.

Gentlemen:

I am to-day in receipt of authority from the Chief of Engineers to contract for a minimum number of 2,500 barrels of "Old Dominion" Portland Cement at Catlettsburg, and 3,500 barrels at Wrights Station, for the work on the Big Sandy River, bids for which were opened on January 21st. I have communicated with the office of the Virginia Portland Cement Co., 81 Fulton Street, New York, from which office the bid was made, and shall forward the contract papers there for execution as soon as they can be prepared.

Very respectfully,
(Signed) H. F. Hodges,
Captain Corps of Engineers.

UNITED STATES NAVY YARD

Norfolk, Va., October 29, 1900

Dear Sirs:

Replying to yours of the 26th, I beg to state that thus far the "Old Dominion" Portland Cement that you have furnished has fulfilled the specifications.

Very respectfully,
(Signed) Fred. Thompson,
Civil Engineer, U. S. N.

Wm. G. Hartranft Co.,
Real Estate Trust Building,
Philadelphia, Pa.

NOTES ON TESTING

The testing of cement is not so simple a process as it is sometimes thought to be. No small degree of experience is necessary before one can manipulate the materials so as to obtain approximately accurate results.

The test for tensile strength on a sectional area of one square inch is recommended because, all things considered, it seems best for general use. In the small briquettes there is less danger of air bubbles, the amount of material to be handled is smaller, and the machine for breaking may be lighter and less costly.

The manner of testing the strength of Portland cement is to mold the sample into a briquette having a sectional area of one square inch and subjecting it to a pulling strain on a proper testing machine until the briquette is torn apart or broken.

For the sake of uniformity the briquettes, both of neat cement and those containing sand, should be immersed in water at the end of 24 hours. All briquettes should be kept covered with damp cloth while exposed to the air.

Clean, fresh water having a temperature between 60 and 70 degrees F., should be used for the mixture and immersion of samples.

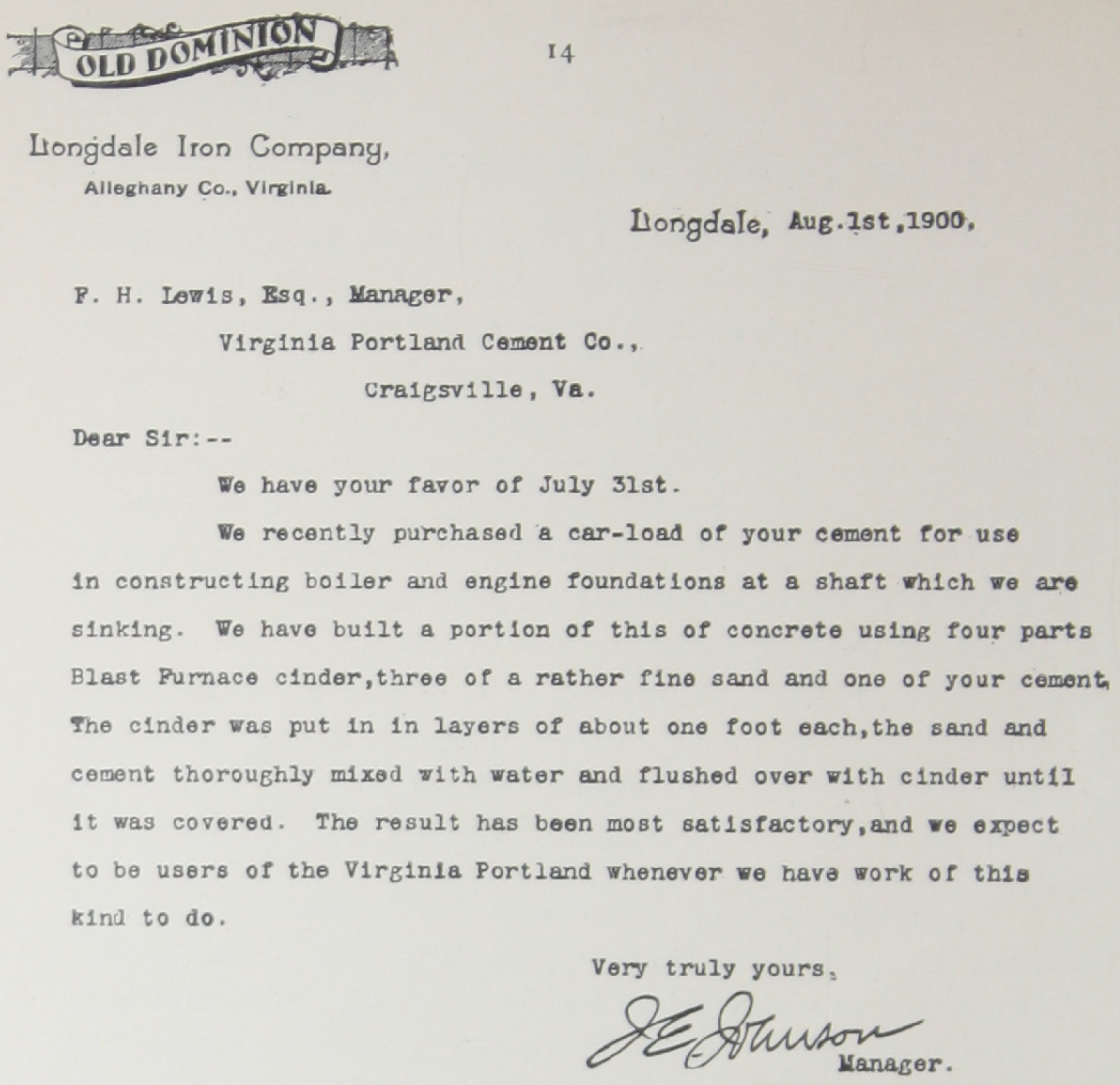
The proportion of water varies with the fineness, age, and other conditions of the cement and the temperature of the air, but is approximately as follows:

For briquettes of neat cement, Portland, 18 to 28 per cent.

For briquettes of one part cement and three parts sand, 8 to 11 per cent. of the total weight of the sand and cement.

If an excess of water is used, that which does not combine chemically with the cement will remain suspended in the mass and be a source of weakness, while, if an insufficient quantity be used, a chemical action will have been set up without the possibility of its being completed, and as a result will be equally fatal to the strength of the cement.

It is not possible to give full instructions in the art of gauging a cement. It can only be acquired by practice.



OLD DOMINION

Longdale Iron Company,
Alleghany Co., Virginia.

Longdale, Aug. 1st, 1900.

F. H. Lewis, Esq., Manager,
Virginia Portland Cement Co.,
Craigsville, Va.

Dear Sir:--

We have your favor of July 31st.

We recently purchased a car-load of your cement for use in constructing boiler and engine foundations at a shaft which we are sinking. We have built a portion of this of concrete using four parts Blast Furnace cinder, three of a rather fine sand and one of your cement. The cinder was put in in layers of about one foot each, the sand and cement thoroughly mixed with water and flushed over with cinder until it was covered. The result has been most satisfactory, and we expect to be users of the Virginia Portland whenever we have work of this kind to do.

Very truly yours,
J E Johnson
Manager.

CAROLINA PORTLAND CEMENT CO.
Imported and Domestic Cements

CHARLESTON, S. C., January 10, 1901

WM. G. HARTRANFT CEMENT CO.,
Philadelphia, Pa.

Gentlemen:

Answering your favor in regard to the "Old Dominion" Portland Cement that we purchased from you would say, we have not had one word of complaint from the 30,000 barrels we bought last year; it has proved sound, and developed uniformly great strength. We place it above all the foreign, or other brands of American cements on the market.

We have supplied it on a number of cotton mills, including the Olympia Mills, at Columbia, S. C., which is one of the largest in the country; also on several dams for water power, and to the Port Royal Navy Yard. (Enclose letter from the Navy Yard.) All of our engineers and contractors are well pleased with it. 500 barrels were used as a trial at the Vanderbilt estate, Biltmore, N. C. Result, they are now using nothing but "Old Dominion." It has given good satisfaction for sidewalk and all high class work, and can always be depended upon.

Very truly yours,
CAROLINA PORTLAND CEMENT CO.,
(Signed) P. G. Hanahan, Sec. and Mgr.

The cement must be brought, by dexterously working it with a trowel, to the proper consistency for filling the molds, and this condition should be attained with the minimum amount of water.

The rapidity with which a cement sets or loses its plasticity furnishes no indication of its ultimate strength. It simply shows its initial hydraulic activity.

For sake of uniformity all sand briquettes should be made of standard crushed quartz as recommended by the American Society of Civil Engineers.

No matter whose make of machine is used for testing, the strain must be applied to the briquette at a uniform rate, otherwise a false result will be obtained, for if the weight is put on very quickly the briquette will bear a greater strain than if it is applied slowly.

The stress should be applied to each briquette at a uniform rate of about 400 pounds per minute, starting each time at O.

In selecting cement for experimental purposes, take the samples from the interior of the original packages at a sufficient depth to insure a fair exponent of the quality and store the same in tightly-closed receptacles, impervious to light or dampness, until required for manipulation, when each sample of cement should be thoroughly mixed, by sifting or otherwise, to insure uniformity in character throughout its mass.

Limestone Deposit, Old Dominion Portland Cement Works

CHESAPEAKE AND OHIO RAILWAY CO.

Richmond, Va., December 20, 1900

Wm. G. Hartranft Cement Co.,
Philadelphia, Pa.

Gentlemen:

I have your letter of the 18th, and beg to acknowledge receipt of the two rubber stamps, for which I am very much obliged.

We have used a great deal of your cement lately and it is giving satisfaction.

Yours truly,
(Signed) F. W. Scarborough,
Engineer Bridges and Signals.

Tests made on Old Dominion Portland Cement
by the
NORFOLK AND WESTERN RAILWAY CO.

Roanoke, Va., February 18, 1901

Wm. G. Hartranft Cement Co.,
Real Estate Trust Building,
Philadelphia, Pa.

Gentlemen:

I have your letter of the 14th instant.

We tested the barrel of "Old Dominion" Portland Cement sent us several months ago. The results of tests received early in January, were as follows:

7 days neat,	722 lbs.
28 " "	975 "
7 " 3 parts crushed quartz	266 "
28 " " " "	285 "

Yours truly,
(Signed) Chas. S. Churchill,
Engineer M. W.

OFFICE OF ASSISTANT ENGINEER OF GRADE REDUCTION
SOUTHERN RAILWAY COMPANY

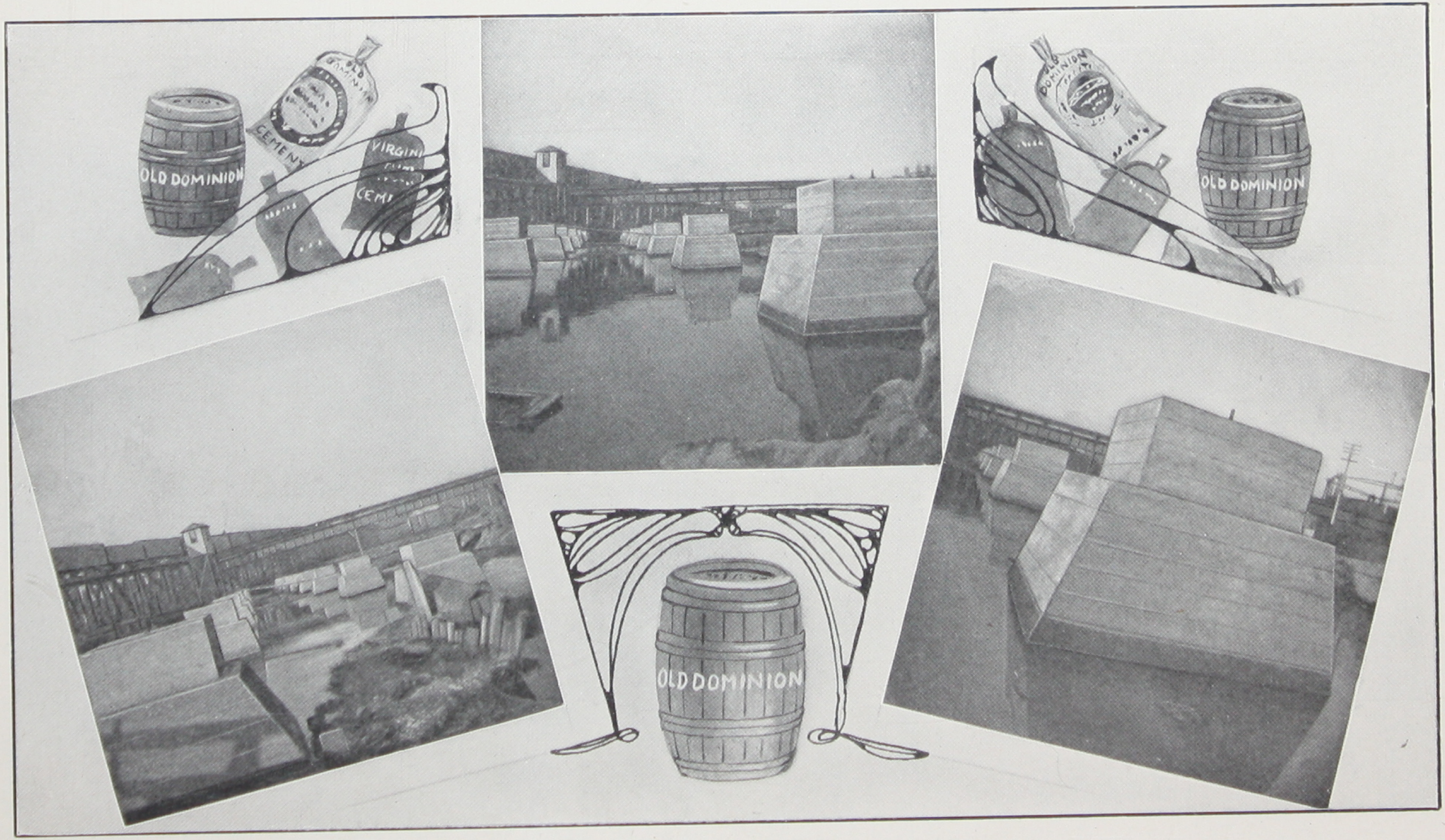
Morristown, Tenn., March 6, 1901

W. G. Hartranft Cement Co.,
Philadelphia, Pa.

Gentlemen:

I have had Mr. Hanson, Superintendent for McArthur Bros. Co., contractors for this work, order from you 205 barrels of "Old Dominion" Portland Cement. As this is a small quantity and needed at once I have had it ordered in this way to save time. We will use this cement in building a pair of concrete abutments.

Very truly yours,
(Signed) W. H. Burk,
Asst. Engr. Southern Railway.



Views of Concrete Foundation C. & O. R. R. Viaduct, Richmond, Va.

Built of Old Dominion Portland Cement

F. W. Scarborough, Engineer

THE GAULEY MOUNTAIN COAL COMPANY

Ansted, Fayette County, W. Va., February 20, 1901

The Miller Supply Co.,
Huntington, W. Va.,

Gentlemen:

We used the "Old Dominion" Portland Cement in foundations for engines and found it to be first-class cement.

Yours truly,
The Gauley Mountain Coal Company,
(Signed) Robert Camm, Supt.

NASHVILLE ROOFING AND PAVING CO.
Contractors

Nashville, Tenn., February 26, 1901

Wm. G. Hartranft Cement Co.,
Philadelphia, Pa.

Gentlemen:

Replying to yours asking our opinion of the "Old Dominion" Portland Cement manufactured at Craigsville, Va., we will state that after having had it thoroughly tested by one of the most competent engineers of the South, we ordered from you and used in the construction of a concrete culvert under trestle 634, on the P. & M. Division of the N. C. & St. L. R. R. Co., about 1,400 barrels of this cement and find it to be one of the highest grade cements we have ever used, and in evidence of our confidence in it we are using it regularly now in our work.

Very truly yours,
Nashville Roofing & Paving Co.,
(Signed) G. M. Ingram, Proprietor.

THE WHITE OAK FUEL CO.
Producers of
The Celebrated New River Coal

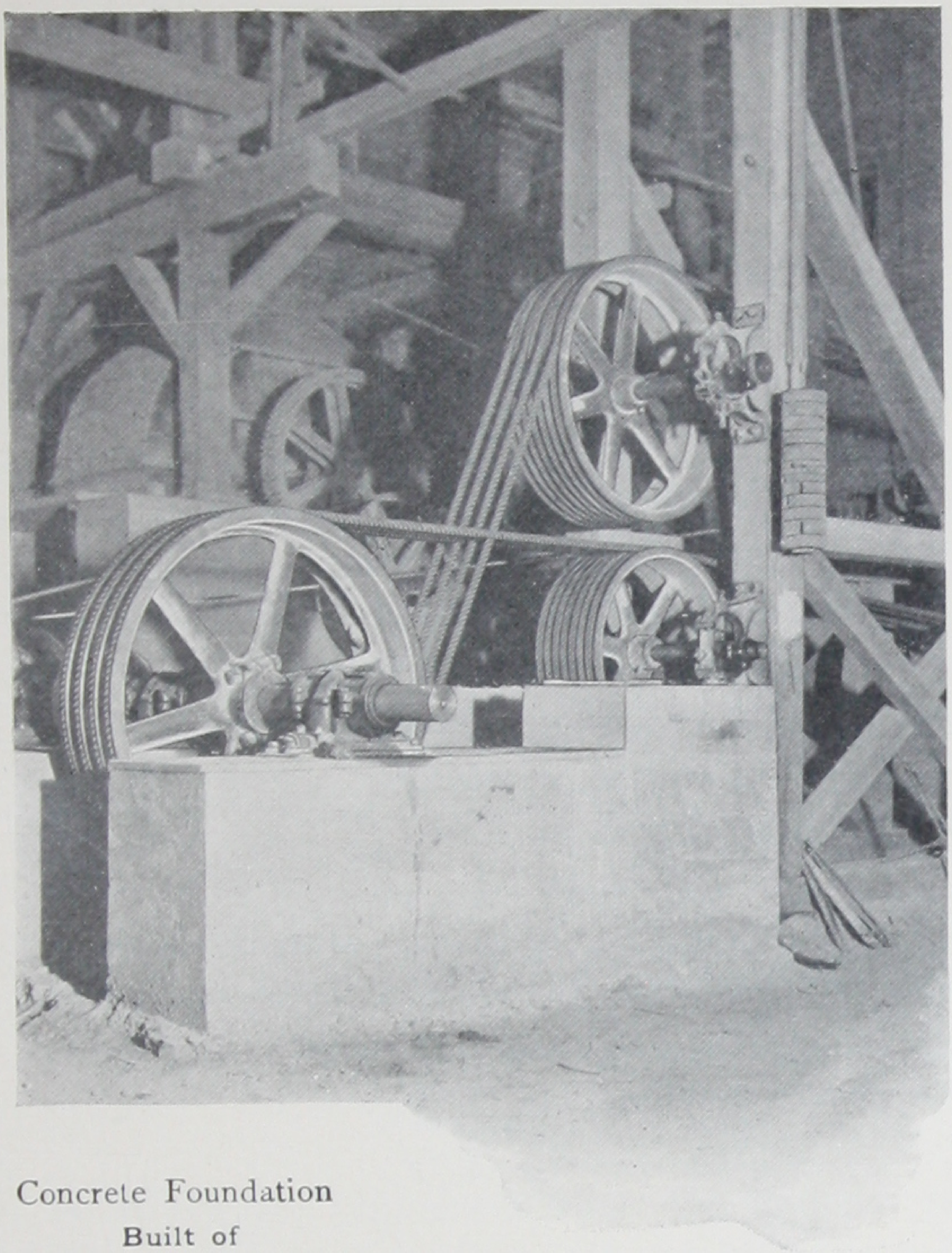
Scarbro, Fayette County, W. Va., February 9, 1901

The Miller Supply Co.,
Huntington, W. Va.,

Gentlemen:

Replying to yours of the 8th, you are welcome to place this company on the list of users of the "Old Dominion" Portland Cement. We have found it gives entire satisfaction.

Yours truly,
(Signed) J. W. Smiley,
Secretary and Treasurer.



Concrete Foundation
Built of
Old Dominion Portland Cement

DIRECTIONS FOR PREPARING PORTLAND CEMENT

To secure the best results from a true Portland cement a few rules must be observed, and although the user may be thoroughly versed in the use of natural cement, lime, etc., he should note carefully the following:

Portland Cement Mortar

Spread out the exact measured quantity of sand in a clean box, pour upon it the exact quantity of cement and mix the whole dry until the sand and cement are thoroughly incorporated. Then add the required quantity of water while the material is being constantly and carefully mixed up. It is advisable to add the water slowly by sprinkling. Continue the mixing until the mortar arrives at a good plastic condition.

Tests made on Old Dominion Portland Cement

U. S. NAVY YARD

Port Royal, S. C., January 9, 1901

Carolina Portland Cement Co.,

Gentlemen:

I am pleased to inform you that the samples of "Old Dominion" Portland Cement, taken for tests from your recent shipments to Mr. R. A. Griffen, to United States Naval Station, Port Royal, have given results as follows:

1st. briquette.................. 750 broke.
2nd. " ....1,000 without breaking.
3rd. " ....1,000 " "
4th. " ....1,000 " "
5th. " ....1,010 broke.
6th. " .... 965 "
7th. " .... 730 "
8th. " .... 870 "
9th. " .... 860 "

Average, 887.

Fineness { 98-¾% passed No. 74 sieve.
98-½% " 80 "
98% " 100 "

Very truly yours,

(Signed) C. W. Noble.

(Contractor in charge R. A. Griffen's work.)

Tests made on Old Dominion Portland Cement
in the
Cement Laboratory
The B. & O. S. W. R'y. Co.
Maintenance of Way Department

Cincinnati, Ohio, January 3, 1901

Maker—Virginia Portland Cement Co.
Kind—Old Dominion Portland Cement.
Date Received—12/3/1900.

Fineness Residue No. 50 sieve—trace
" " 74 " 0.7%
" " 100 " 3.4%

Percentage of water used Neat briquettes 20%
Sand " 10-½%

Average strength of ten briquettes one inch square.

24 hrs. in air (neat) ....356 lbs.
24 hrs. in air 6 days in water (neat) ....740 "
24 hrs. in air 27 days in water (neat) .... 794 "
24 hrs. in air 6 days in water (1 cement, 3 quartz sand) 217 "
24 hrs. in air 27 days in water (1 cement, 3 quartz sand) 245 "

Pat test O. K.

(Signed) C. W. Boynton, correct.
C. Lewis, approved.

If too much water is added it retards the setting, especially in damp, cold weather, and the work will become less dense and therefore less durable.

Portland Cement Concrete

Add to the sand and cement prepared as before mentioned, while still dry, the exact quantity of broken stone, mix the whole mass several times over with the required amount of water until all the ingredients are thoroughly and evenly mixed.

Concrete should not contain more water than will give it the appearance of freshly dug earth, and when rammed in and tamped down water should appear on the surface which will indicate that sufficient water has been used. Such work will attain great density and uncommon durability.

The quantity of broken stone to be used in concrete, provided it is of good quality, does not weaken the concrete, which will obtain the strength which the mortar of cement and sand would attain without the additional stone.

It is, however, important that the cement mortar should closely cover and fill up all the interstices which may exist between the stone and to diminish these as much as possible; the stone employed should consist of a proper proportion of various sizes, from one quarter to two inches in diameter, which will pack very closely.

The following proportions have been found to answer for most purposes for which concrete is used, to be varied as nature of work, quality of the sand, or the size of the stone may require:

1 part Portland Cement.
3 parts Sharp Sand.
7 parts Broken Stone.

There is an erroneous idea that concrete tipped into position from a height is given solidity by the fall; unfortunately, however, the larger pieces of the aggregate fall to the ground first, smaller pieces next, and, last of all, the mortar, so that the aggregate and matrix is separated

UNITED STATES NAVY YARD

PORT ROYAL, S. C., January 9, 1901

CAROLINA PORTLAND CEMENT CO.,
Charleston, S. C.

Gentlemen:

The following is in reply to your request of the 31st ult. as to the tests on "Old Dominion" Portland Cement.

The briquettes were broken on a 1,000 pound cement machine which is capable of measuring stresses of 1,030 pounds—all briquettes broken at seven days. Three out of the ten briquettes made from the shipment to Mr. Richard H. Griffen withstood a stress of 1,030 pounds without breaking: an average for the shipment was 920 pounds; subsequent shipments did not run so high. The average for all briquettes made from the cement received in barrels was 733 pounds.

Yours respectfully,
(Signed) CAPT. GEO. MACKAY,
Civil Engineer, U. S. N.,
In charge engineering work.

JOHN I. BRADY & CO.

612-14 and 16 Bourse Building

PHILADELPHIA, January 26, 1901

WM. G. HARTRANFT CEMENT CO.,
Philadelphia, Pa.

Gentlemen:

In answer to your letter in reference to "Old Dominion" Portland Cement you shipped us for the Government contract at the Norfolk Navy Yard would say, the cement has been tested by the Government and proved satisfactory, having met all the requirements.

Very truly yours,
(Signed) JNO. I. BRADY & CO.,
C.

PENN BRIDGE COMPANY

Contractors and Manufacturers of

Bridges and Structural Material in Iron or Steel

BEAVER FALLS, PA., January 2, 1901

WM. G. HARTRANFT CEMENT CO.,
Philadelphia, Pa.

Gentlemen:

We take pleasure in stating that we have used a large amount of your "Old Dominion" Portland Cement in the construction of buildings for the United States Government at the Navy Yard, Norfolk, Va., and that it has given entire satisfaction, meeting the requirements and specifications of the Government.

Very truly yours,
PENN BRIDGE CO.,
(Signed) Sam. P. White, President.

and the value of the mass as an even and solid concrete is destroyed.

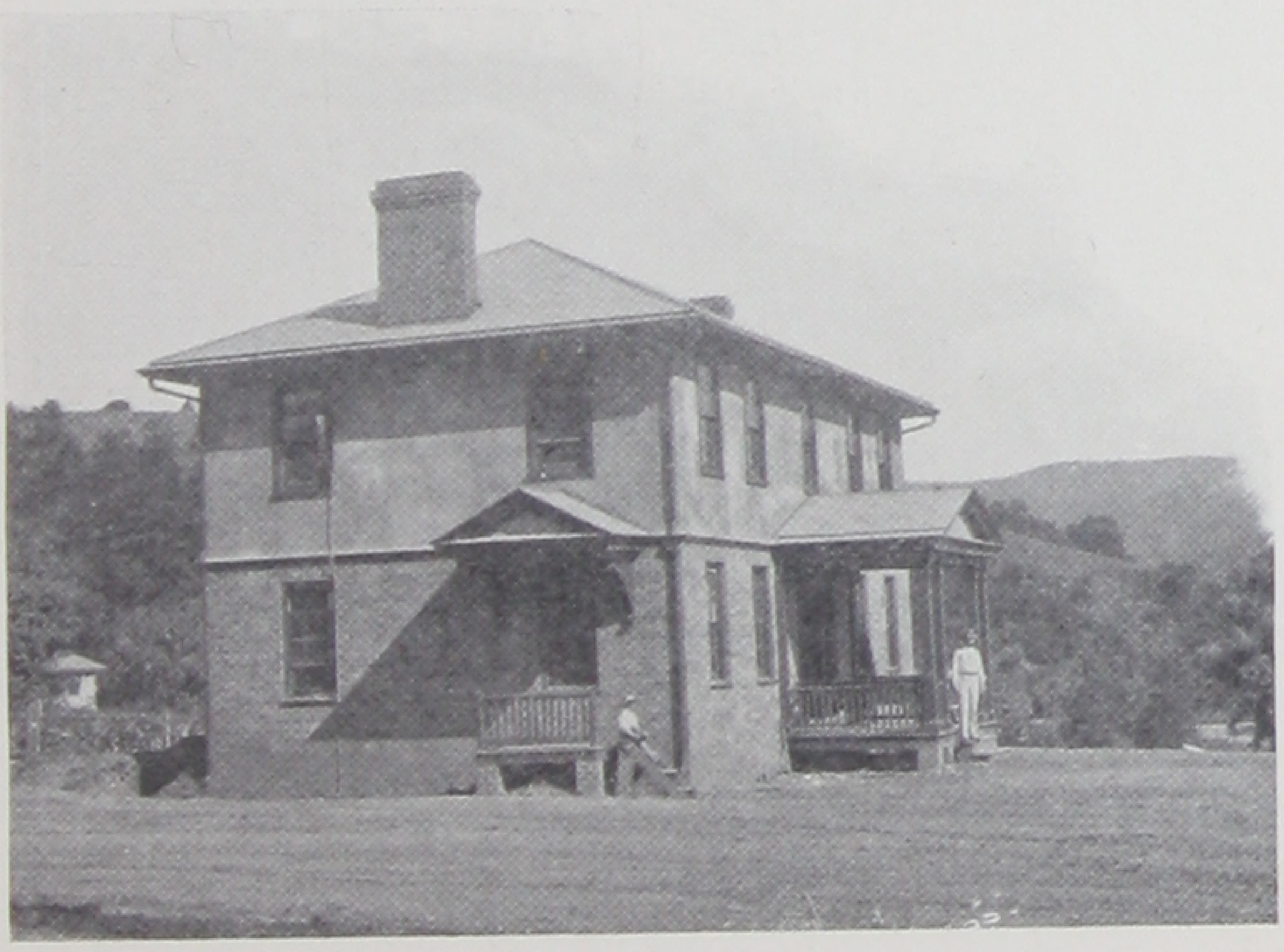
If the nature of the work is such that it cannot be mixed up where it is actually to lay, it should be taken and gently tipped into position and afterwards well rammed.

Artificial Stone for Walks and Floors

Carefully prepare the concrete in the manner described above, put down and tamp to a depth of three to five inches; on the top of this a stiff mortar composed of equal parts of cement and finely crushed granite or a material equally gritty is laid to a depth of an inch to an inch and a half and then carefully smoothed. This will form the surface of the stone, so the entire thickness will be from four to six inches. Very large blocks should be from five to seven inches thick.

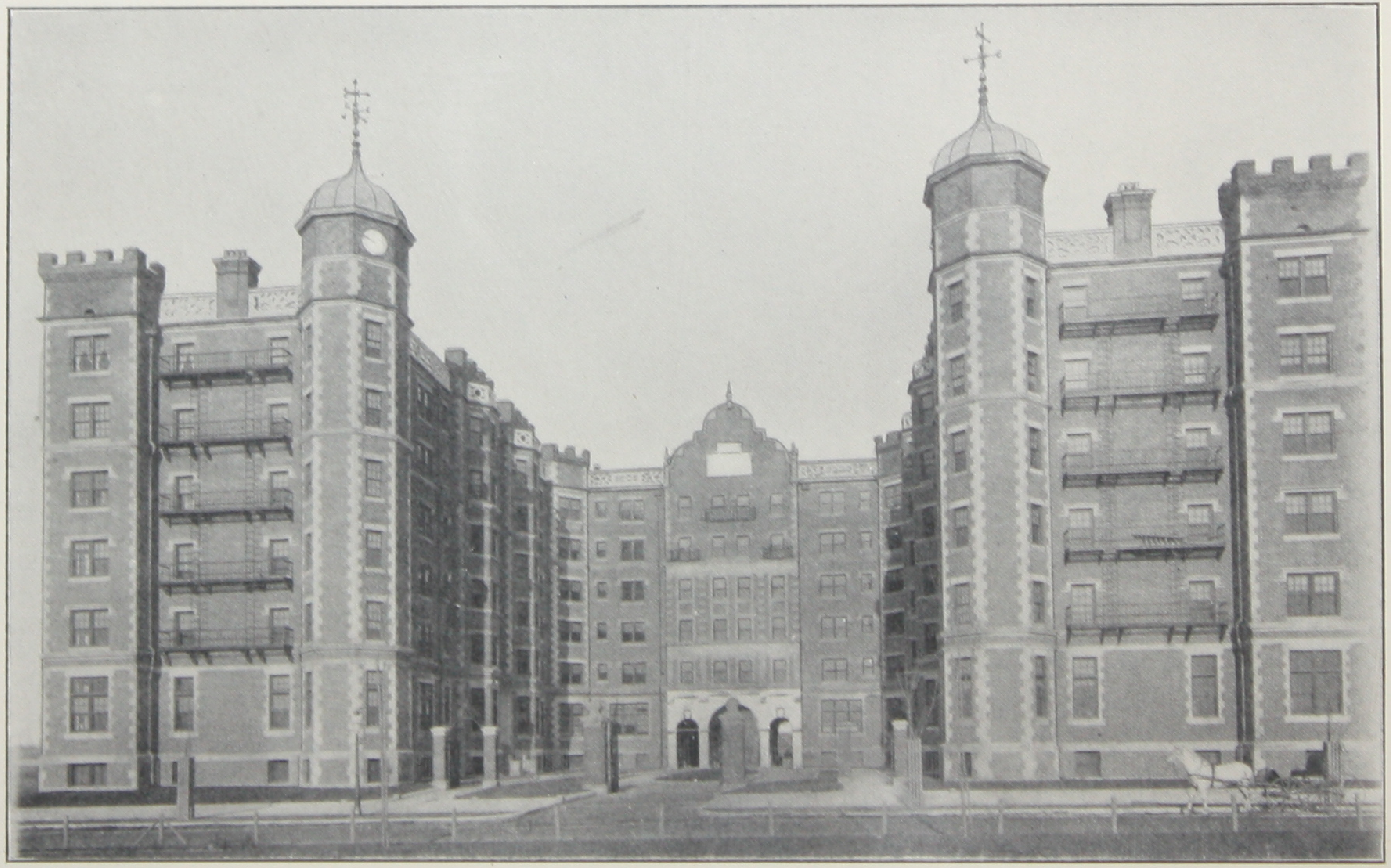
It is advisable to put a foundation twelve inches deep of broken stone or cinders below the concrete, which should be well rammed, leveled off and moistened, so that the stone or cinders will not absorb the water from the cement. Such foundation will act as a natural drainage, and it will prevent the forcible breaking of the stone by the expansion of the soil after a severe frost.

In hot weather all newly laid cement pavements should be kept moist for some days by covering them with canvass, which should be sprinkled repeatedly.



Chemical and Physical Laboratory

Old Dominion Portland Cement Works



Riverbank Court Apartment House, Boston, Mass.

Fireproof Floors and Sidewalks Built of Old Dominion Portland Cement

Tests made on Old Dominion Portland Cement

In Laboratory of

CITY ENGINEERING DEPARTMENT

Newport News, Va., October 27, 1900

Set Initial —
Set Final 4 hrs.
Per cent. coarse 9%

Average Tensile strength of ten Briquettes one inch square.

24 hrs. in air 1 day in water (neat)	445 lbs.
24 hrs. in air 6 days in water (neat)	814 "
24 hrs. in air 6 days in water (1 cement, 2 quartz sand)	278 "

(Signed) T. B. Hoffman,
Engineer in charge of tests.

OLD DOMINION

WARREN BROTHERS COMPANY

Roofing, Paving, Concrete, Artificial Stone, etc.

Boston, Mass., December 26, 1900

Messrs. Wm. G. Hartranft Cement Co.,
Philadelphia, Pa.

Gentlemen:

Replying to your favor we would say that we have used your "Old Dominion" Portland Cement for granolithic and foundation work to a considerable extent, and have found it very satisfactory.

Among the important pieces of work where we have used it are the floors of the Riverbank Court Building, the largest apartment house that has been erected in this vicinity this year. It was also used in the concrete arches carrying the traffic of Massachusetts Avenue over the Fitchburg Railroad. These arches are built to sustain loads of thirty tons and upwards, and are constructed entirely of concrete. We also used it in the construction of our own dock, depending upon the strength of the concrete in place of stone masonry.

It is a cement of good color, and owing to its extreme fineness will give better results when using a given amount of sand than can be secured with most of the Portland cements now on the market.

We can recommend it for sidewalk and other construction work, where the nature of the use requires that each barrel shall be strong and of good quality. We have not known of one individual barrel which has failed in doing the work expected of it.

Yours respectfully,
Warren Brothers Company,
(Signed) By F. J. Warren, Pres.

Tests made on Old Dominion Portland Cement
In Laboratory of
DR. HENRY FROEHLING

RICHMOND, VA., December 21, 1900

From C. & O. Railway Co.,

Fineness Residue No. 50 sieve 0 5
" " 100 " 2.7

Set Initial 3 hrs. 10 min.
Final 7 "

Check tests—satisfactory.

Average Tensile strength of four Briquettes one inch square.

24 hrs. in air 1 day in water (neat)	590 lbs.
24 hrs. in air 6 days in water (neat)	917 "
24 hrs. in air 27 days in water (neat)	1009 "
24 hrs. in air 6 days in water (1 cement, 3 quartz sand)	258 "
24 hrs. in air 27 days in water (1 cement, 3 quartz sand)	308 "

(Signed) HENRY FROEHLING.

Tests made on Old Dominion Portland Cement
In Laboratory of
JULIAN O. HARGROVE

WASHINGTON, D. C., October 16, 1900

Fineness Residue No. 50 sieve none
" " 100 " 6%

Set Initial 4 hrs. 55 min.
Final 8 "

Average Tensile strength of three Briquettes one inch square.

24 hrs. in air (neat)	417 lbs.
24 hrs. in air 6 days in water (neat)	843 "
24 hrs. in air 27 days in water (neat)	919 "
24 hrs. in air 6 days in water (1 cement, 3 quartz sand)	355 "
24 hrs. in air 27 days in water (1 cement, 3 quartz sand)	454 "

Specific gravity, 3,0769.
Pat tests in air and water, good.

(Signed) JULIAN O. HARGROVE.

JAMES DEMORUELLE & SONS
Dealers in
Building Materials

New Orleans, La., January 3, 1901

Mr. F. H. Bayley, Selling Agent,
826 Union Street,
New Orleans, La.

Dear Sir:

We have been carrying in stock recently your "Old Dominion" Portland Cement, and we take especial pride in saying it is a great favorite among our customers. It is a cement that gives perfect satisfaction, both in color and strength and it works with very much facility. We highly recommend the "Old Dominion" Portland Cement in every respect and it should meet with great success.

Very truly yours,
(Signed) James Demoruelle & Sons.

JOHN L. WISDOM
Dealer in
Lime, Cement, etc.

Jackson, Tenn., December 20, 1900

Wm. G. Hartranft Cement Co.,
Philadelphia, Pa.

Gentlemen:

Your "Old Dominion" Portland Cement gave good satisfaction, and our City Engineer is highly pleased with it. I expect to handle a great many cars of it next season.

Very truly yours,
(Signed) Jno. L. Wisdom.

THOMAS NOLAN
Manufacturer of
Star White Lime

Nashville, Tenn., November 14, 1900

Wm. G. Hartlanft Cement Co.,
Philadelphia, Pa.

Gentlemen:

Answering your favor of recent date in regard to your cement would say, that I have handled and used a large quantity of your "Old Dominion" brand of Portland Cement, manufactured at Craigsville, Va., and find that it gives perfect satisfaction to my trade. All who have used it ask for the "Old Dominion" brand. It is used here for tiling purposes, engine beds, side walks and cellar floors, and all first-class work. My trade say there is none any better.

Yours respectfully,
(Signed) Thomas Nolan.

Parker Street Primary School, Roxbury, Mass.

Floors and Sidewalk built of Old Dominion Portland Cement

S. Adams Webber, Architect — Fessenden & Libbey, Builders

OLD DOMINION

Analysis of Old Dominion Portland Cement

By

A. W. DOW, Ph.B.

WASHINGTON, D. C., March 11, 1901

Silica SiO_2	22 80%
Iron Fe_2O_3	2.67%
Alumina Al_2O_3	7.63%
Lime CaO	61.94%
Magnesia MgO	2.88%
Sulphuric Acid SO_3	1.39%

J. F. BALDWIN
Building Material

Birmingham, Ala., March 5, 1901

Carolina Portland Cement Co.,

Gentlemen:

You will probably be glad to know on a recent test made with "Old Dominion," "Lagerdoffer," "Alsens" and other brands of Portland Cement, by the architect for the new $200,000 City Hall for this city, I was awarded first prize for "Old Dominion."

All tests were made alike with slag and sand and remained three weeks under water; "Old Dominion" having at least from 25 to 40 per cent. the advantage over the best of these brands. I expect to do considerable business this year on "Old Dominion."

Yours truly,
(Signed) J. F. Baldwin.

R. D. APPENSON
GEN. MANAGER.

OFFICE OF THE
City Street Car Company
120 WEST MAIN STREET

TELEPHONES
OFFICE { No. 48 BELL
No. 96 MUTUAL
POWER STATION
BELL 43 MUTUAL 114

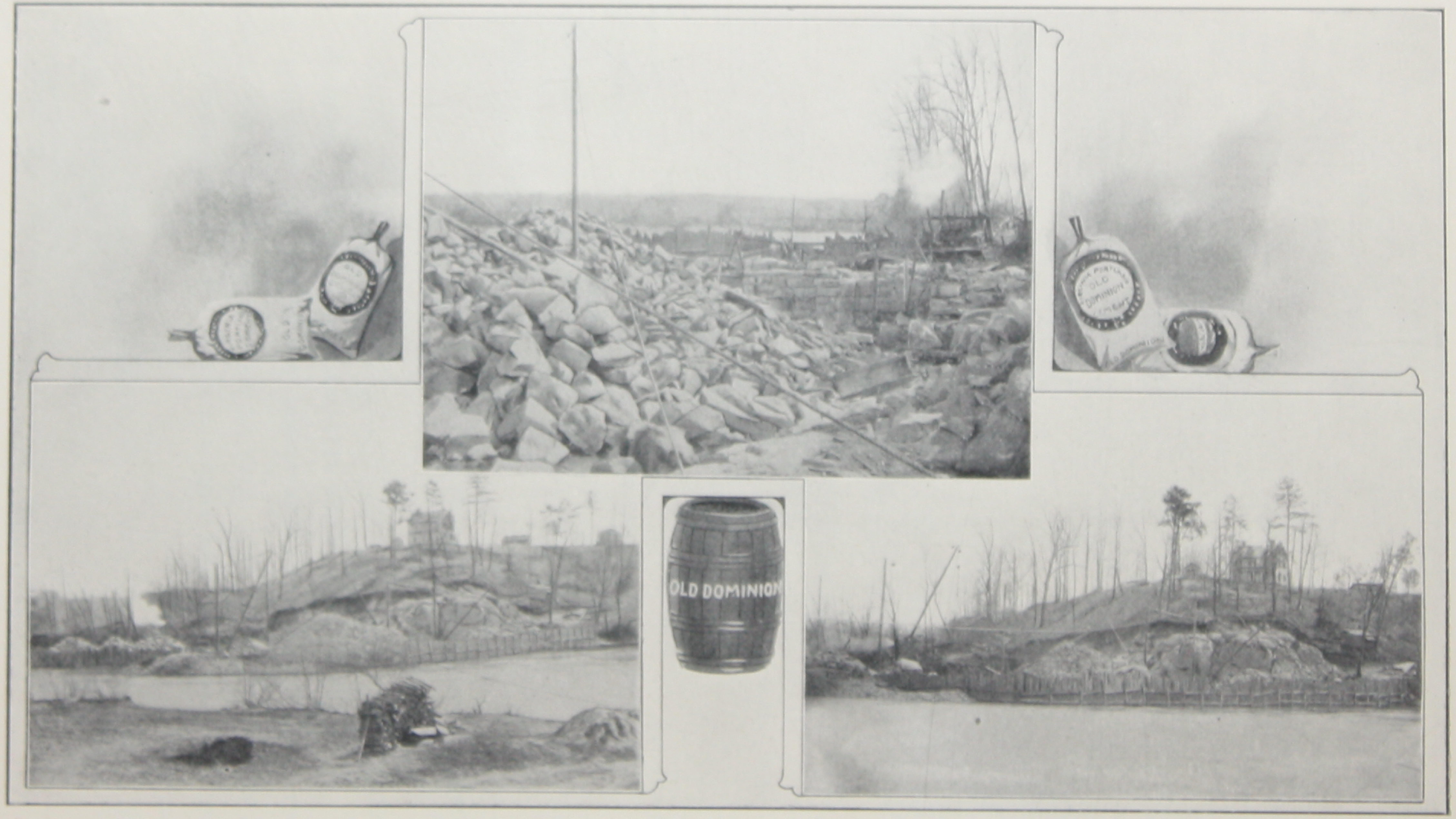
STAUNTON, VA., August 4th, 1900.

Virginia Portland Cement Co.,
Craigsville, Va.

Gentlemen:-

Your favor of the 31st July received. The cement we purchased from you was used to top off our engine foundations, and I am pleased to say that it is as good as any cement I ever used, and had your plant been completed sooner, we would have used it in all our foundations.

Yours very truly,
RDAppenson
General Manager.



Views of Construction of Catawba Power and Electric Co.'s Dam, Rock Hill, S. C.

Being Built of Old Dominion Portland Cement

A. & C. WRIGHT & CO.
General Contractors

Columbia, S. C., February 18, 1901

Carolina Portland Cement Co.,
Gentlemen:

In reply to your inquiry as to merits and quality of "Old Dominion" brand of Portland Cement, of which our contract calls for 3,000 to 5,000 barrels for the Catawba Power & Electric Co., we beg to state that this cement is used in the very highest grade of work and gives the very highest degree of satisfaction. We pronounce it the finest brand of American Portland Cement we have used in our long experience.

Making a specialty of heavy masonry, dam work, and building of all kinds, we are of the opinion that the "Old Dominion" brand will have our exclusive patronage in the future.

Yours truly,
(Signed) A. & C. Wright & Co.

OLD DOMINION

ADAMS BROS.-PAYNES COMPANY
Dealers in
Building Supplies

Lynchburg, Va., February 6, 1901

Wm. G. Hartranft Cement Co.,
Real Estate Trust Building,
Philadelphia, Pa.
Gentlemen:

We have your favor of the 5th inst., asking us in reference to the cement which we have used known as the "Old Dominion" Portland Cement, manufactured at Craigsville, Va. In reply to your letter, it gives us pleasure to state that we sold a good many barrels of this cement, have used it for masonry, for granolithic work, and street paving, and in every instance and under every condition it has proven to be strictly first class, and we have no hesitation in saying that we regard it equal in quality to any cement on the market.

Very truly yours,
(Signed) Adams Bros.—Paynes Co.,
P.

W. N. FISHBURNE

WAYNESBORO, VA., February 30, 1901

WM. G. HARTRANFT CEMENT CO.,

Dear Sirs:

I sent you picture of building to-day.

Building is 45 feet 10 inches in front by 31 feet back, about 34 feet above pavement at highest point; 13 inch walls first story—11 inches second story; pillars 16 inches by 22 inches (12 feet high); cornice, etc., of concrete.

Walls were mixed about three barrels "Old Dominion" Portland Cement to 100 cubic feet—pillars and some parts we wanted very strong ran four to four and a half barrels cement per 100 cubic feet. About 4,000 cubic feet in walls.

I used as near as I can count 145 two-horse loads of gravel and sand, running about one cubic yard to load and averaging two thirds gravel........................Cost,	$ 50.00
Cement about	290.00
Labor	223.00
About fifteen barrels of small rock broken came out of excavation	10.00
Lumber, etc., for molds—about........................	60.00
Total	$633.00

I have a good deal of lumber and can use it on building this spring (I will add 30 feet back of present building for electric plant), so say 4,000 cubic feet cost $600 or $15 per 100 cubic feet.

Bricks at $10 per 1,000 laid (cheapest I could get) would have cost about $20, as 1,000 will lay from 50 to 54 cubic feet.

I still have to go over building with a thin coat of cement and sand to cover up marks of molds, etc., but you see I saved nearly 25 per cent. and believe I have a far better house.

Yours truly,

(Signed) W. N. FISHBURNE.

W. J. McGEE

Architect and Builder

JACKSON, MISS., March 11, 1901

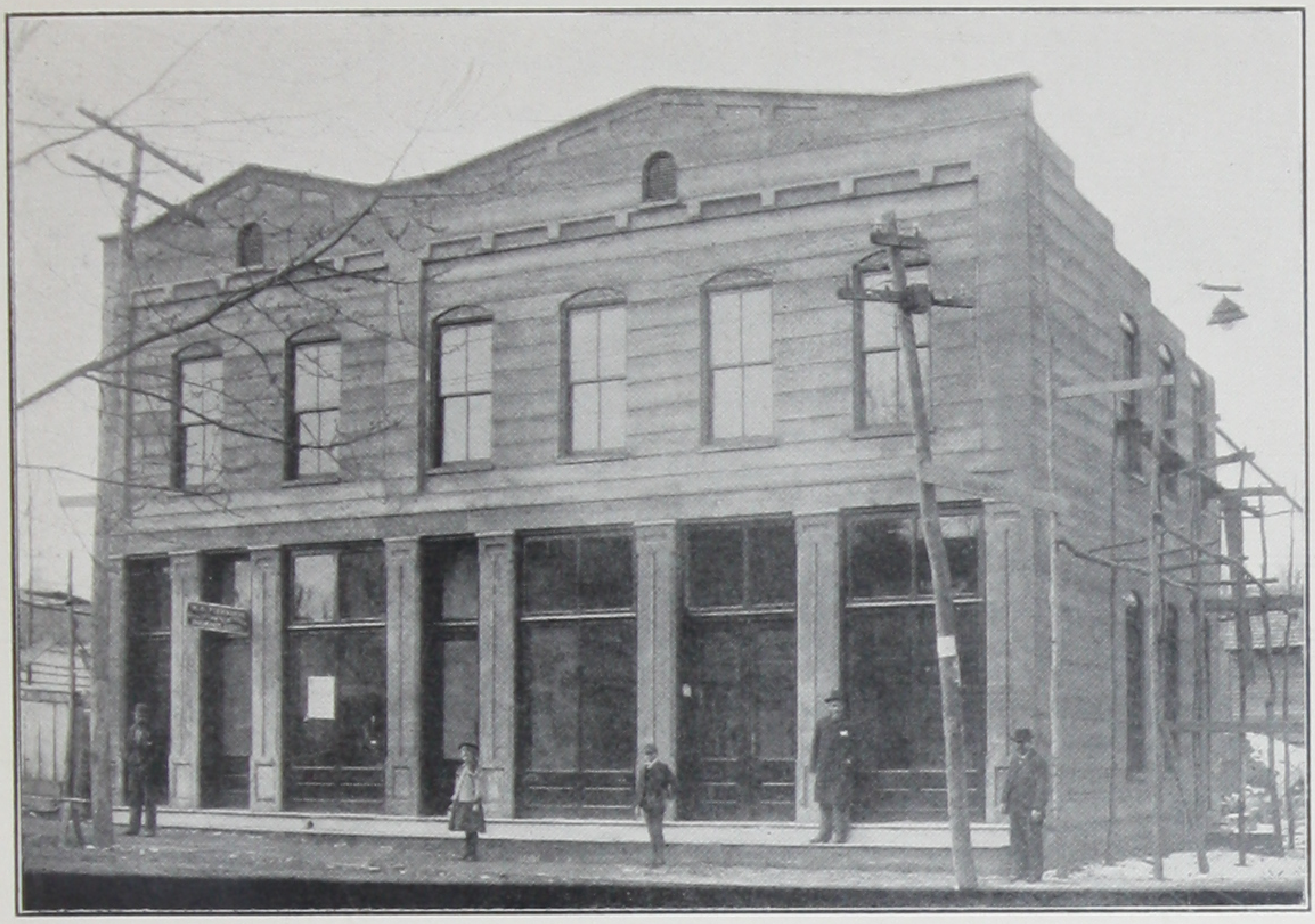
MR. F. H. BAYLEY,
New Orleans, La.

Dear Sir:

It affords me much pleasure to recommend "Old Dominion" Portland Cement. It is one of the most satisfactory brands of cement that I have ever used, and I do not hesitate to recommend it to any one who wants to use a high grade of cement and obtain first-class work.

Yours respectfully,

W. J. McGEE.



Monolithic Concrete Building, Waynesboro, Va.
Built of Old Dominion Portland Cement
By W. N. Fishburne

Test made on Old Dominion Portland Cement by the City of Boston

WARREN BROTHERS COMPANY
143 Federal Street

Boston, Mass., February 11, 1901

Gentlemen:

Below is a test made by the Cement Tester for the City of Boston of the "Old Dominion" Portland Cement:

Neat	7 days	high	970 lbs.	low	772 lbs.
"	1 month	"	1,000 "	"	860 "
2 parts sand, 1 cement	7 days	"	290 "	"	170 "
2 " "	1 month	"	460 "	"	410 "

Fineness—5 per cent. stood in 100 mesh sieve, 8 per cent. stood in 120 mesh sieve.

(Signed) Fred. J. Warren.

Tests made on Old Dominion Portland Cement

In Laboratory of

THE OSBORN ENGINEERING CO.

CLEVELAND, OHIO, September 10, 1900

Taken from Stowe-Fuller Co.'s warehouse.

Set Initial 1 hr. 38 min.
Final 3 " 30 "

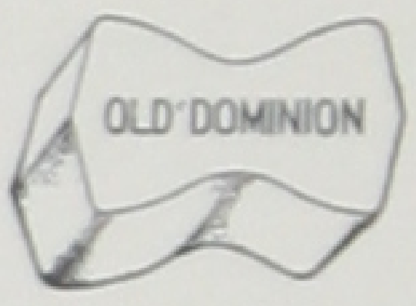
Fineness Residue No. 80 sieve 3.9
" " 100 " 6.9

Hot test O. K. Cold water O. K.

Average Tensile strength of three Briquettes one inch square.

24 hrs. in air (neat)	556 lbs.
24 hrs. in air 6 days in water (neat)	705 "
24 hrs. in air 27 days in water (neat)	800 "
24 hrs. in air 6 days in water (1 cement, 3 quartz sand)	218 "
24 hrs. in air 27 days in water (1 cement, 3 quartz sand)	234 "

(Signed) THE OSBORN ENGINEERING CO.



A. F. WITHROW & CO.
Builders, Masons, etc.

CHARLESTON, W. VA., February 26, 1901

WM. G. HARTRANFT CEMENT CO.,
Philadelphia, Pa.

Gentlemen:

We have been contractors in brick and stone work for twenty years, and to ascertain the quality of material used, we go to skilled mechanics that we have on our work. We used several hundred barrels of "Old Dominion" Portland Cement in the erection of the Court House at Staunton, Va., and the writer made it a point to ask each man who used the trowel what he thought of the cement. The men did not know where it came from. The reply from each and every one was that they had never seen anything to equal it, "where did you get it?"

We had occasion to make some openings in basement walls only two weeks old and discovered that the grip was so great that the limestone of which the wall was built would part before the cement joint. This mixture was on a basis of three parts sand to one part cement. We find it more economical to use your cement than any cheap cement that we can buy.

Yours truly,

(Signed) A. F. WITHROW & Co.,
A. F. Withrow.

T. T. WILSON

Building Material

Chattanooga, Tenn., November 14, 1900

Wm. G. Hartranft Cement Co.,
Philadelphia, Pa.

Gentlemen:

Please ship me one car of "Old Dominion" Portland Cement on the 20th of this month.

You ask me how the cement pleased our trade; I will say, that it is giving good satisfaction for all kinds of work. We have used it for side-walk work, cisterns and all kinds of work. We are well pleased and do not want anything better.

Very truly,
(Signed) T. T. Wilson.

SCIPLE SONS

Manufacturers of Snow Flake Lime

Atlanta, Ga., October 29, 1900

Wm. G. Hartranft Cement Co.,
Philadelphia, Pa.

Gentlemen:

We are in receipt of your favor of the 26th, and in reply beg to say we are furnishing the Atlantic Tile Co., of this city, your "Old Dominion" Portland Cement for making hexagon tile side walks and even for the curbing. We are selling numerous others your cement for side walks and cellar floors, basements, etc., and have yet to receive the first complaint; it has received the highest praise from every one who has used it.

We regard it the best brand of Portland Cement we have ever handled and we have handled nearly every kind of English, German, Belgium and a good many of the American Portland Cements.

Please ship us two more cars. We have not received either of the last three cars ordered and we have only a few barrels in our warehouse.

Very truly yours,
(Signed) Sciple Sons.

L. H. McCAMMON BROS.

Dealers in

Cement, Lime, Plaster and Sewer Pipe

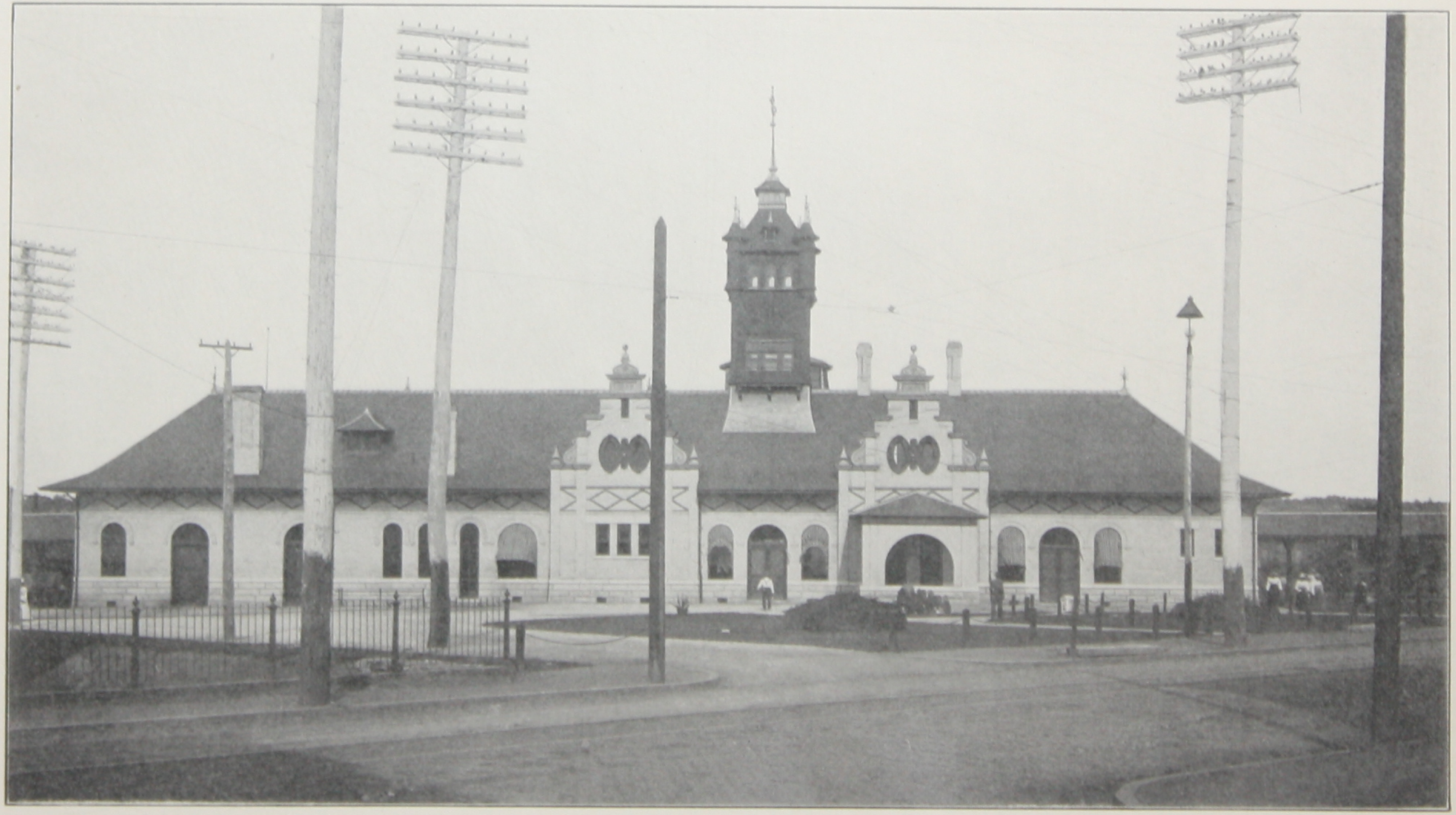
Cincinnati, Ohio, December 31, 1900

Wm. G. Hartranft Cement Co.,
Philadelphia, Pa.

Gentlemen:

We desire to state in relation to the "Old Dominion" brand of American Portland Cement we purchased of you, that we are more than pleased with it. We have tested it by use on various kinds of work from ordinary concrete to sidewalks and curb and gutter work, and it has proved first class in every instance; we could ask for nothing better.

Very truly yours,
(Signed) L. H. McCammon Bros.



Union Depot, Danville, Va.

Sidewalks, Etc., Built of Old Dominion Portland Cement

JAMES I. PRITCHETT
Dealer in
Cement, Plaster, etc.

Danville, Va., October 29, 1900

Wm. G. Hartranft Cement Co.,
Philadelphia, Pa.

Gentlemen:

Replying to yours of the 26th inst., I beg to advise that I have used the "Old Dominion" Portland Cement for side walks around the new Union Depot here, and I am pleased to inform you that it gave perfect satisfaction in every particular. The contractor who used it is a very intelligent man, and he tells me, in his judgment, it is equal to "Dyckerhoff Portland Cement."

Yours very truly,
(Signed) J. I. Pritchett.

Tests made on Old Dominion Portland Cement
in the
ENGINEER'S OFFICE
UNITED STATES ARMY

Little Rock, Ark., October 10, 1900

Fineness, Residue No. 100 sieve 3.8%.
Soundness, good.
Average tensile strength in pounds per square inch.
24 hrs. in air 6 days in water (neat) 576 lbs.
24 " " " 27 " " " 710 "

(Signed) Robert McGregor,
Captain Corps of Engineers.

BUILDERS' SUPPLY CO.
Manufacturers of and Dealers in
Cement, Brick, Lime, etc.

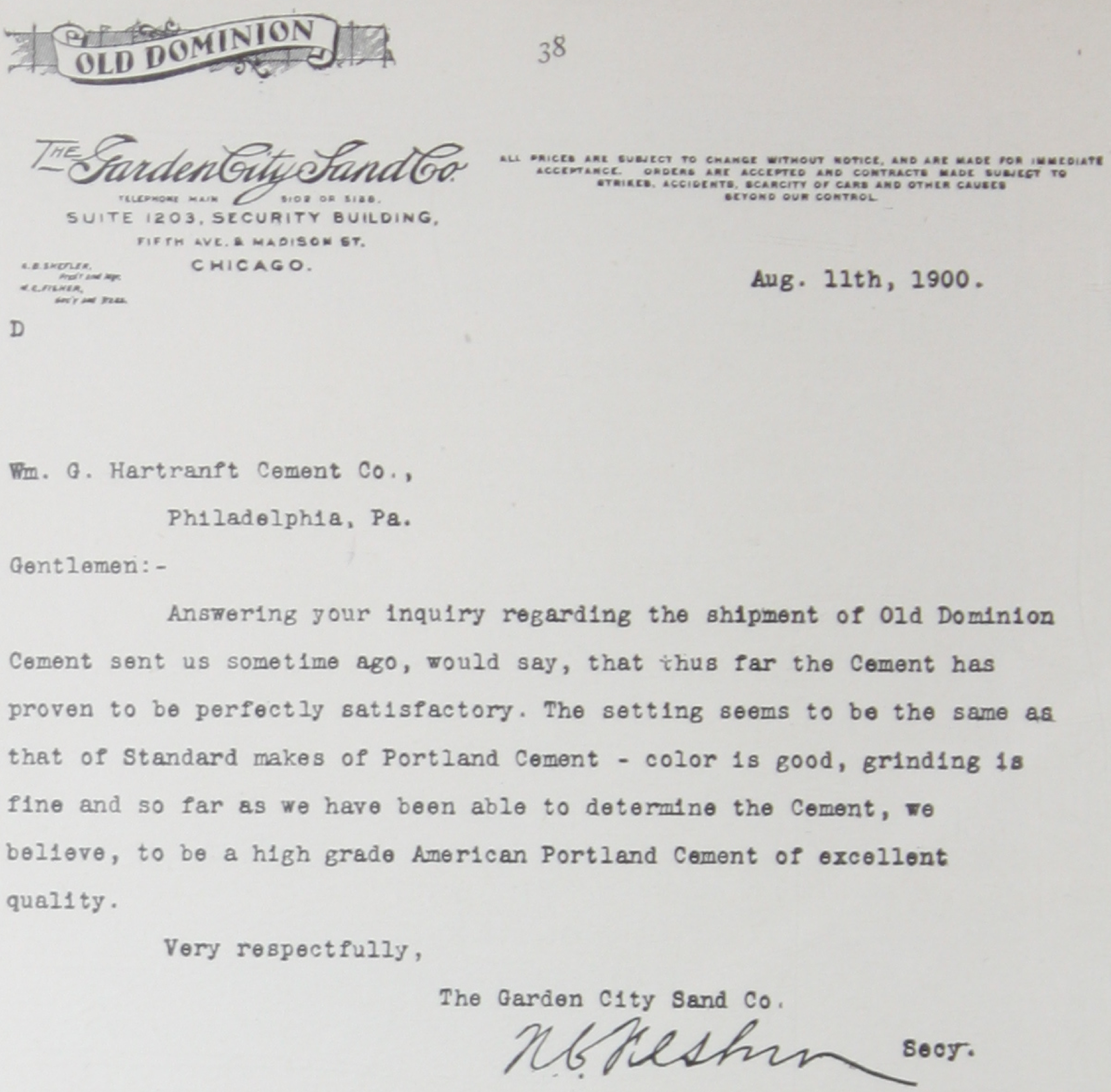
St. Augustine, Fla., February 23, 1901

Carolina Portland Cement Co.,

Gentlemen:

We are making a thorough test of the "Old Dominion" Portland Cement. We have for years used the "Hanover" and other German brands of cement. We seem to obtain as good, if not better results from the "Old Dominion" with from ten to twenty-five per cent. more of sand. At this time we believe the "Old Dominion" brand to be superior to any which we have used before.

Yours very respectfully,
Builders' Supply Co.,
(Signed) Heth Canfield, President.



OLD DOMINION

The Garden City Sand Co.
TELEPHONE MAIN 5102 OR 5188.
SUITE 1203, SECURITY BUILDING,
FIFTH AVE. & MADISON ST.
CHICAGO.

A. B. SHEFLER,
Pres't and Mgr.
W. C. FISHER,
Sec'y and Treas.

ALL PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE, AND ARE MADE FOR IMMEDIATE ACCEPTANCE. ORDERS ARE ACCEPTED AND CONTRACTS MADE SUBJECT TO STRIKES, ACCIDENTS, SCARCITY OF CARS AND OTHER CAUSES BEYOND OUR CONTROL.

Aug. 11th, 1900.

D

Wm. G. Hartranft Cement Co.,
Philadelphia, Pa.

Gentlemen:-

Answering your inquiry regarding the shipment of Old Dominion Cement sent us sometime ago, would say, that thus far the Cement has proven to be perfectly satisfactory. The setting seems to be the same as that of Standard makes of Portland Cement - color is good, grinding is fine and so far as we have been able to determine the Cement, we believe, to be a high grade American Portland Cement of excellent quality.

Very respectfully,

The Garden City Sand Co.
W. C. Fisher Secy.

Office of
THOMAS DAILEY
Chief Engineer C. I. S. R. R. Co.

Ashland, Ky., February 12, 1901

The Miller Supply Co.,
Huntington, W. Va.

Gentlemen:

I have used the "Old Dominion" Portland Cement with very satisfactory results.

Yours respectfully,

(Signed) Thos. Dailey,
Chief Engineer.

JAMES RIVER LUMBER AND SUPPLY CO.

Newport News, Va., November 6, 1900

Wm. G. Hartranft Cement Co.,
Philadelphia, Pa.

Gentlemen:

The car of "Old Dominion" Portland Cement, ordered for the city has been tested by their engineer as follows:

2 days neat 445 lbs.
7 " " 814 "
7 " (1 to 2) 278 "

The city is entirely satisfied with the cement. Please let us have another car at once.

We have just succeeded in getting the order from Mr. Richardson for 2,000 barrels of "Old Dominion" Portland Cement for the Twenty-eighth Street bridge, to be shipped as soon as work is ready.

Yours respectfully,
(Signed) James River Lumber & Supply Co.

Tests made on Old Dominion Portland Cement

ENGINEER'S OFFICE

UNITED STATES ARMY

415 Custom House

Cincinnati, O., January 23, 1901

Average tensile strength in pounds per square inch.

24 hrs. in air (neat) 410 lbs.
24 " " " 6 days in water (neat) 827 "

Pats in air and water O. K.

(Signed) A. M. Campbell,
Assistant Engineer.

Charleston, S. C., October 2, 1900

Mr. Peyre G. Hanahan,
Secretary Carolina Portland Cement Co.,
City.

Dear Sir:

Herewith I send you the result of the test of "Old Dominion" American Portland Cement:

Tensile Strength in pounds per sq. in.

19% water.

743
717
690
680
664

} Neat. Seven days test, twenty-four hours in air and six days in water.

Total, 3,494
Average, 699

Respectfully,
(Signed) R. B. Olney,
A. S. C. E.

Olympia Cotton Mill, Columbia, S. C.

Old Dominion Portland Cement Used in Construction of Mills and Reservoir

W. B. Smith Whaley & Co., Engineers

B. F. WITHERS
Dealer in
Cement, Lime, Plaster, etc.

Charlotte, N. C., February 14, 1901

Carolina Portland Cement Co.,

Gentlemen:

I have handled several hundred barrels of "Old Dominion" Portland Cement, and have found the same to give the best results, and entire satisfaction to my trade. I hope to sell it very largely during the coming year.

Respectfully yours,
(Signed) B. F. Withers,
Per R. W. B.

SHAND BUILDERS' SUPPLY CO.
Dealers in
Building Materials

Columbia, S. C., February 5, 1901

Carolina Portland Cement Co.,

Gentlemen:

In reply to your letter of recent date, asking us as to what we think of the "Old Dominion" brand of American Portland Cement we beg to state as follows:

The "Old Dominion" brand of cement has been supplied by us to some of the most important works going on in Columbia, among them the million dollar Olympia Cotton Mill, and has in every instance given the most satisfactory results.

We hope to sell a great deal of cement during the present year, and will sell "Old Dominion" brand as the highest grade of cement that we handle.

Yours truly,
(Signed) Shand Builders Supply Co.

J. J. CLARKE CO., Ltd.
Dealers in
Building Material

New Orleans, La., January 3, 1901

Wm. G. Hartranft Cement Co.,

Gentlemen:

Replying to your inquiry as to the results of our sales of your cement would state, we have been handling three or four cars of "Old Dominion" Portland Cement, and never had a complaint as to its quality.

Yours respectfully,
(Signed) J. J. Clarke Co., Ltd.,
C. Taylor Gauche, Pres. and Treas.

NATIONAL MORTAR CO.

Lime, Cement, Sand Etc.

Washington, D. C., March 7, 1901

Wm. G. Hartranft Cement Co.,
Philadelphia, Pa.

Gentlemen:

Replying to your favor of March 5th, we are pleased to say that the "Old Dominion" Portland Cement we have bought from you from time to time during the past six or seven months has given us very good satisfaction. In addition to supplying it to our local trade we have supplied it for use on the buildings for the Bureau of Printing and Engraving, and also the Washington Navy Yard; to the latter place we have supplied several different lots. The cement has met the requirements of the Government at both places and proved entirely satisfactory.

Very truly yours,
National Mortar Co.,
(Signed) S. Dana Lincoln, Treas.

CITY ENGINEERING DEPARTMENT

Jackson, Tenn., December 24, 1900

Wm. G. Hartranft Cement Co.,
Philadelphia, Pa.

Gentlemen:

Replying to your inquiry in regard to your "Old Dominion" Portland Cement, we are highly pleased with it and think it is superior to anything we have used for brick work and concrete purposes.

Yours truly,
(Signed) Sam. C. Lancaster,
City Engineer.

THE GENERAL SUPPLY CO.

Building Material

Norfolk, Va., March 8, 1901

Wm. G. Hartranft Cement Co.,
Philadelphia, Pa.

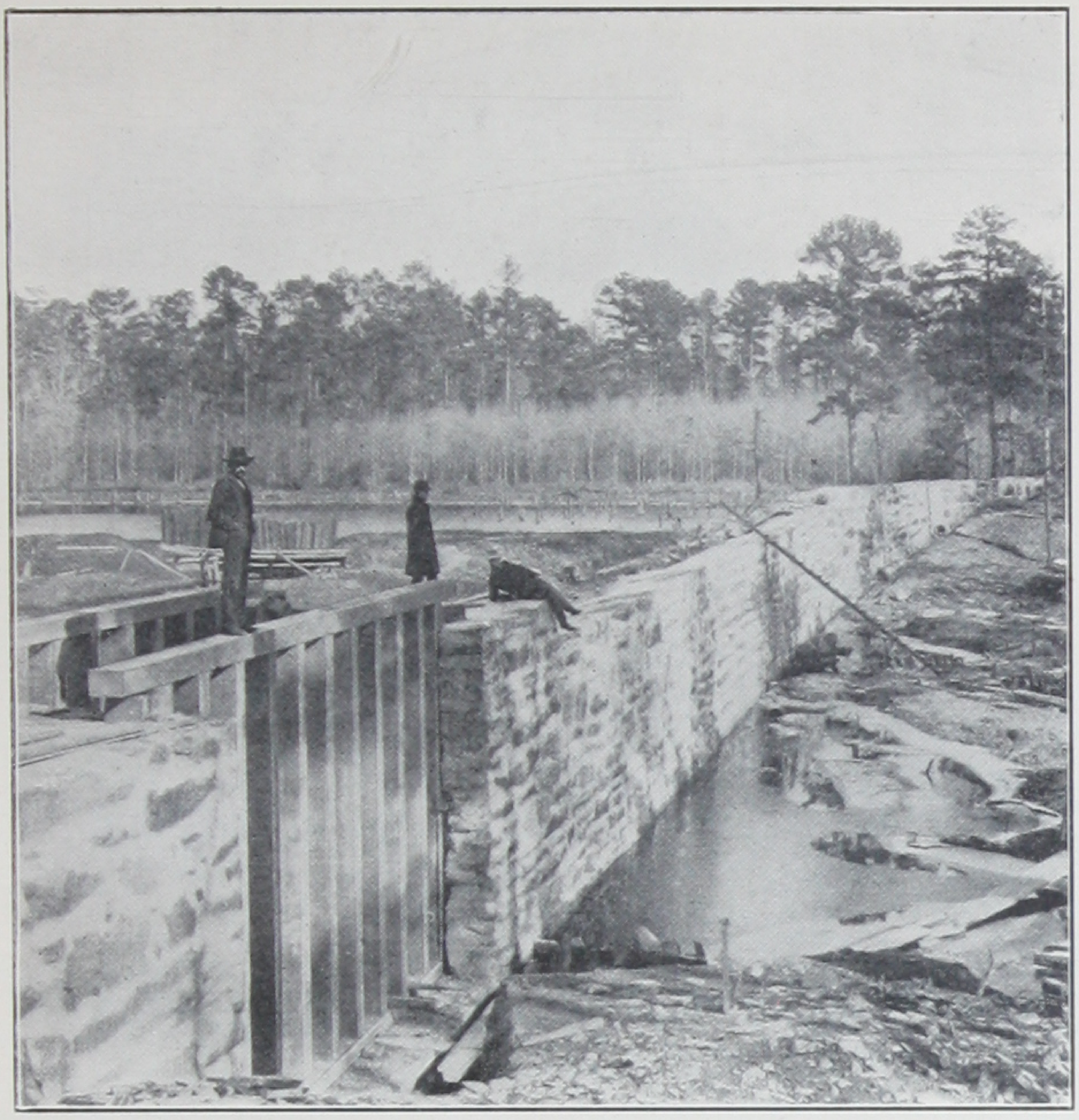
Gentlemen:

We are pleased to advise that the "Old Dominion" Portland Cement has given entire satisfaction to our trade, which uses only high grade Portland.

Last year we furnished to the United States Navy Yard, at Norfolk, 500 barrels of "Old Dominion," and it fully satisfied their very rigid tests. We have sold to the United States Navy Yard, here this year 1,500 barrels of "Old Dominion" to this date, and they are much pleased with the uniform test of the same.

We are so thoroughly satisfied with the great superiority of this cement that we have concluded to handle no other Portland in this market.

Yours truly,
The General Supply Co.,
(Signed) John C. Taylor, Pres.



Dam on Little River, near Vass, N. C.
Built of Old Dominion Portland Cement

OLD DOMINION

McDONALD BROS.

WEST END, N. C., December 26, 1900

CAROLINA PORTLAND CEMENT CO.,

Gentlemen:

Under another cover we mail you a photograph of dam on Little River, near Vass, N. C., built with your "Old Dominion" Portland Cement. The dam contains 1,645 cubic yards. The cement was very satisfactory.

Yours truly,

McDONALD BROS.

Charlotte Consolidated Construction Co.'s Building, Charlotte, N. C.

Old Dominion Portland Cement used exclusively in construction

CHADWICK MANUFACTURING CO.

Manufacturers of

Fine Sheetings

CHARLOTTE, N. C., February 18, 1901

CAROLINA PORTLAND CEMENT CO.,

Gentlemen:

Yours of February 13th received. We have used about twelve hundred (1200) barrels of "Old Dominion" Portland Cement, and we are more than satisfied with it. We would not hesitate to place an order again should we need any more cement.

Yours truly,

(Signed) CHADWICK MFG. CO.,
Per E. C. Dwelle, Secretary.

PIERCE & AKERS CO.
Coal, Wood, Lumber, Bricks, Cement, etc.

LYNCHBURG, VA., August 3, 1900

WM. G. HARTRANFT CEMENT CO.,
Philadelphia, Pa.

Gentlemen:

The car of "Old Dominion" Portland Cement was received, and we are glad to note that it has given general satisfaction, and we have had no complaints.

We see no reason why we should not sell large quantities of this cement.

Yours,
(Signed) PIERCE & AKERS CO.

EMPIRE STEEL AND IRON CO.
Empire Building, New York

GOSHEN, VA., August 4, 1900

MR. F. H. LEWIS,
Manager,
Craigsville, Va.

Dear Sir:

Replying to yours 31st ult., we beg to say the "Old Dominion" Portland Cement purchased from you, and which was used in our Blowing Engine foundations, for concreting around the furnace and for lining our cinder kettles was in every way satisfactory and the results most gratifying. The analysis and tests of the cement by our chemist confirms all that you claim for it.

Yours very truly,
(Signed) EMPIRE STEEL & IRON CO.,
By C. H. Thompson, Asst. Supt. and Engr.

THE STOWE-FULLER CO.
Manufacturers and Dealers in
Building Materials

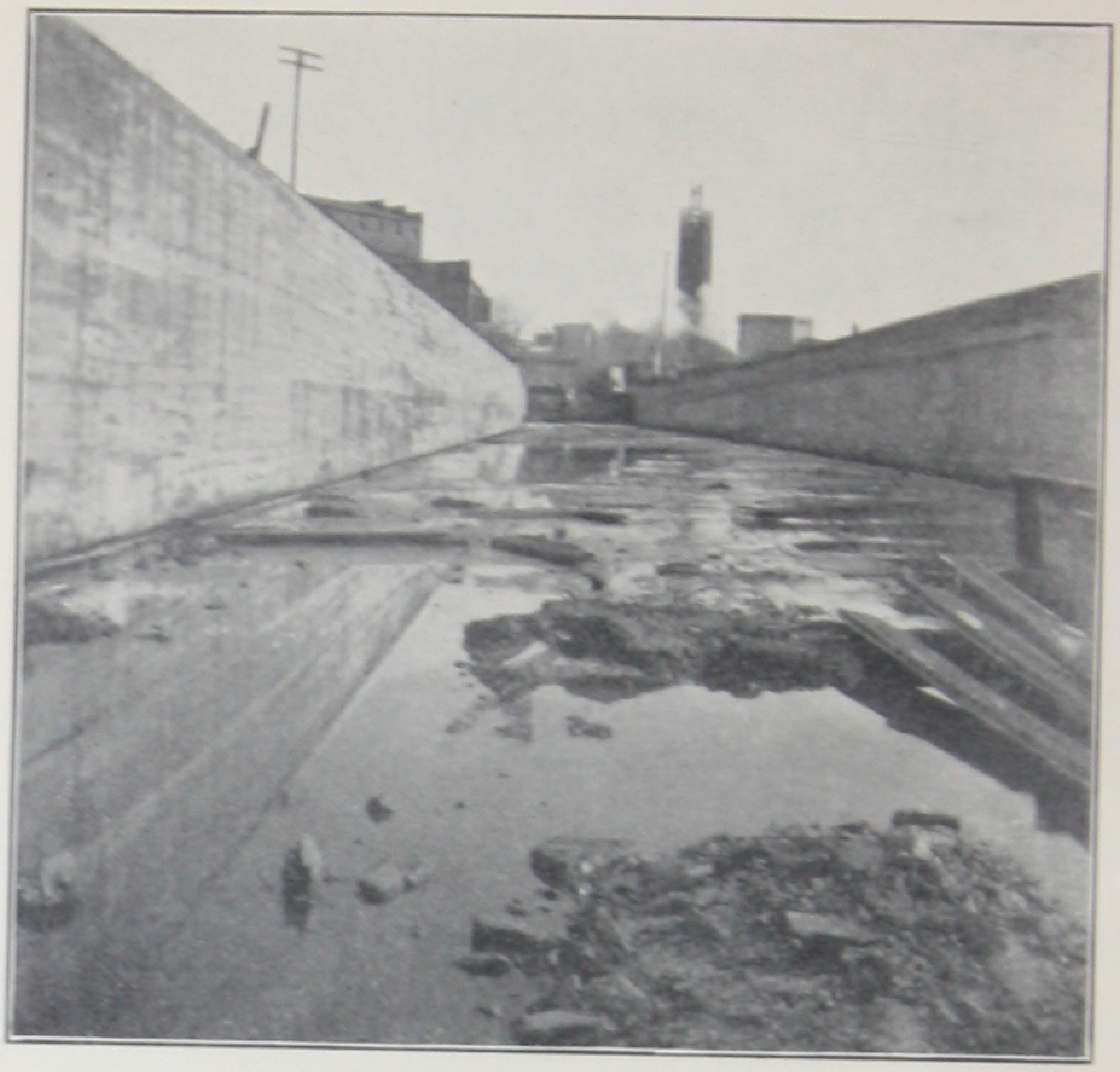
CLEVELAND, O., December 31, 1900

WM. G. HARTRANFT CEMENT CO.,
Philadelphia, Pa.

Gentlemen:

In answer to your letter of December 29th, would say, that we have had your "Old Dominion" Portland Cement during the summer and fall which has been used by our sidewalk men here, and the report they give on same is very satisfactory. We have also used some of your cement at other points, and the report on same has always been favorable on its quality.

Yours truly,
(Signed) STOWE-FULLER CO.,
C. B. Stowe, President.



Concrete Walls, James River Power and Construction Co.'s Canal
Richmond, Va.

3500 Barrels of Old Dominion Portland Cement Used in Construction

F. H. BAYLEY
Sewer Pipe and Portland Cement
826 Union Street

New Orleans, La., February 13, 1901

Messrs. Wm. G. Hartranft Cement Co.,
Real Estate Trust Building,
Philadelphia Pa.

Gentlemen:

It affords me pleasure to be able to say that during the past eight months I have been selling "Old Dominion" Portland Cement in this market for work where high grade cement has been specified and it has always given satisfaction.

This cement has been lately accepted for some paving work on Canal Street, and I feel safe in saying that no better cement has ever come to this market.

Very truly yours,

(Signed) F. H. Bayley.

SCIPLE SONS

Coal, Coke, Lime, Cements

Atlanta, Ga., July 25, 1900

W. G. Hartranft Cement Co.,
Philadelphia.

Gentlemen:

These tests were made in the City Engineer's office in this city.

"Old Dominion" Portland Cement—24 hrs. in air and 6 days in water.

Briquette No. 1, 586 lbs. Briquette No. 2, 570 lbs.
" No. 3, 510 " " No. 4, 610 "
" No. 5, 440 " " No. 6, 550 "
General Average—544 1/3 lbs.

No. 5 was injured while putting in the clamps, is the reason it shows such low tensile strain.

Yours truly,
(Signed) Sciple Sons.

W. A. GUENTHER & SONS

Hardware, Iron, Steel, etc.

Owensboro, Ky., March 23, 1901

Wm. G. Hartranft Cement Co.,
Philadelphia, Pa.

Gentlemen:

We wish to state for your information that the City Engineering Department have testing scales; they tested Schifferdecker and found it not half as strong as "Old Dominion"; they also tested Alsen, Atlas, and others and found them all weaker than the "Old Dominion" brand. We will further state that the cement we furnished the City Engineering Department for the testing purpose was taken from ordinary stock while some of the other samples they tested were sent specially by the manufacturers.

Yours truly,
(Signed) W. A. Guenther & Sons.

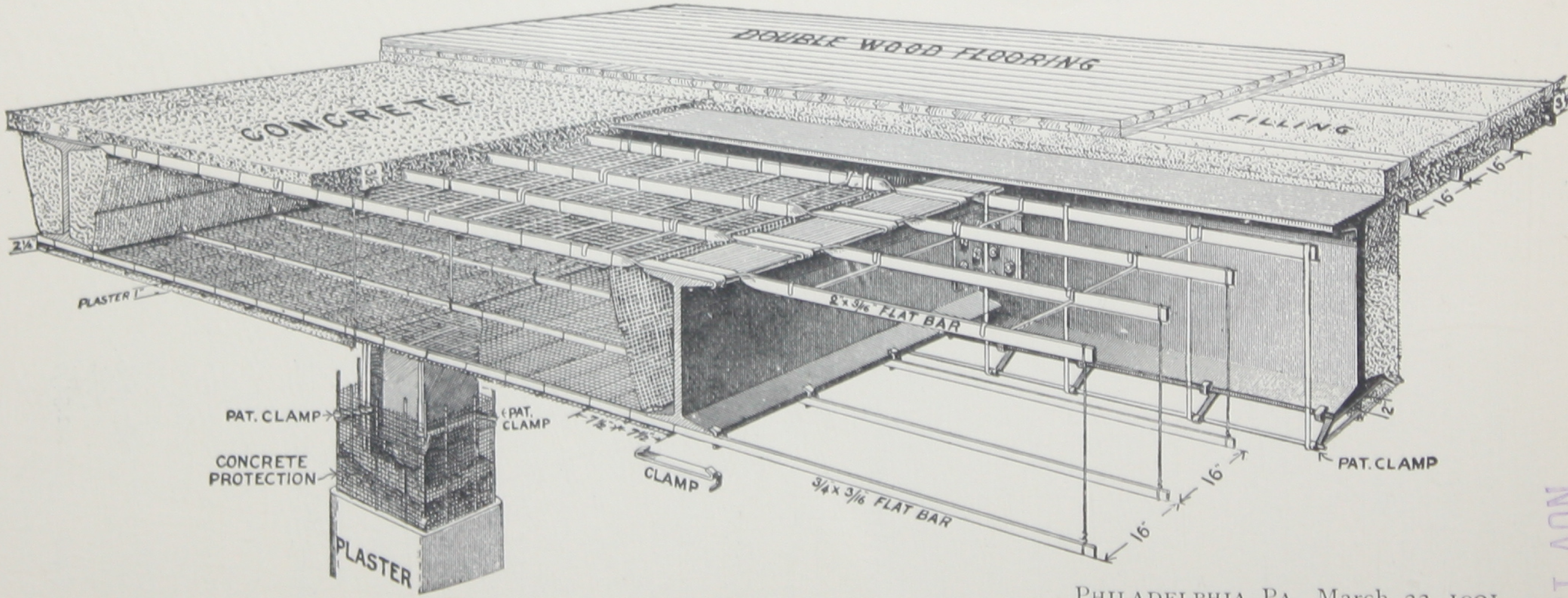
Copy of Analysis made by

BOOTH, GARRETT & BLAIR

Philadelphia, Pa., August 29, 1900

Silica	20.65%
Alumina	6.93%
Oxide of Iron	2.76%
Lime	63.47%
Magnesia	2.76%
Sulphuric Acid	1.34%

ROEBLING SYSTEM B, TYPE 1, FIRE-PROOF FLOOR CONSTRUCTION



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Philadelphia, Pa., March 22, 1901

Messrs. Wm. G. Hartranft Cement Co., Philadelphia.

Gentlemen :

In reply to your letter of March 21, asking us for our opinion of the "Old Dominion" Cement for which you are the General Agents, would say that we have used a very large quantity of your cement in our fire proof construction and notably on work in the Port Royal Navy Yard, the Norfolk Navy Station, Station for C. & O. & S. A. L. in Richmond, the Polk Apartments in Nashville and various other jobs and have found that it always gave us very satisfactory results. We hope to be able to give you another large order in the near future.

Very truly yours,
Roebling Construction Co.,
Signed H. N. Corning.

Made by George H Buchanan and
Company at the Sign of the Ivy
Leaf in Library Street Philadelphia